VINEYARD MID-ATLANTIC

SITE ASSESSMENT PLAN

JANUARY 2024

PREPARED BY:

Epsilon ASSOCIATES INC.

SUBMITTED BY:

VINEYARD MID-ATLANTIC LLC

VINEYARD MID-ATLANTIC

VINEYARD OFFSHORE

Vineyard Mid-Atlantic Site Assessment Plan

For Metocean Buoy

Lease OCS-A 0544

Prepared by:
Epsilon Associates

Prepared for:
Vineyard Mid-Atlantic LLC

January 2024

Site Assessment Plan (SAP)
For Metocean Buoy
Lease OCS-A 0544
Vineyard Mid-Atlantic

New York Bight

***Submitted by*:**

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1.0 EXECUTIVE SUMMARY

Vineyard Mid-Atlantic LLC (the "Proponent") seeks Site Assessment Plan (SAP) Approval from the Bureau of Ocean Energy Management (BOEM) to install, maintain, operate, and decommission one "non-complex" meteorological and/or oceanographic (metocean) buoy and one supplemental wave and current sensor placed on the seafloor (referred to as a Trawl Resistant Bottom Mount [TRBM]) on its Lease Area OCS-A 0544. The installation of the metocean buoy and TRBM is referred to as "the Project." The purpose of the Project is to gather Lease-specific wind and ocean current data to support development of offshore renewable wind energy facilities in Lease Area OCS-A 0544. This development of offshore wind energy generation facilities is referred to as Vineyard Mid-Atlantic. Installation of the metocean buoy and TRBM, which will be conducted without anchoring of installation vessels to minimize seafloor impacts, is planned for February 2024. The proposed metocean buoy will be Ocean Tech's EOLOS FLS200 Light Detection and Ranging (LiDAR) buoy, a metocean buoy type that has already been approved by BOEM (for the Vineyard Northeast SAP). The floating metocean buoy will be secured to the seafloor by a single chain and a single mooring weight (also referred to as an "anchor") to minimize bottom disturbance and the risk of entanglement or entrainment of marine biota. The proposed TRBM measures 0.6 m (2.0 ft) high, 1.8 m (5.9 ft) long, and 1.6 m (5.2 ft) wide and will be placed on the seafloor approximately 100 m (328 ft) from the metocean buoy and will undergo recovery and replacement every six months.

The Proponent has identified two study areas (SAP-1 and SAP-2) within the Lease Area, one of which will be used for the metocean buoy and TRBM. The Proponent has also conducted all necessary field surveys and within the two study areas. Evaluation of the field survey data specific to the SAP study areas, including review by a Qualified Marine Archaeologist (QMA), has confirmed that conditions within both SAP study areas are suitable for deployment and operation of the metocean buoy and TRBM. Evaluation of the survey data in each SAP study area found no evidence of natural seafloor and shallow subsurface geohazards; no man-made hazards suggestive of shipwrecks, debris, abandoned fishing gear, cables, pipelines and potential ordnance; no evidence of sensitive habitats; no evidence of historic properties; and no evidence of shallow subsurface paleo features that could be indicative of former glacial meltwater streams or fluvial channels. Vibracore samples did not recover any peat layers that could be indicative of potential terrestrial soils. The QMA recommended a determination of "no historic properties" affected (36 Code of Federal Regulations (CFR) 800.4).

2.0 INTRODUCTION

2.1 Summary of Proposed Activities

Vineyard Mid-Atlantic LLC (the Proponent) proposes to install one metocean buoy in Lease Area OCS-A 0544 within the New York Bight Wind Energy Area (NYB WEA) of the Atlantic Ocean, as designated by the Bureau of Ocean Energy Management (BOEM). The Lease Area is located in federal waters of the Outer Continental Shelf (OCS), south of Long Island, New

York. One metocean buoy will be deployed in one of the two proposed locations (SAP-1or SAP-2). The device to be deployed is anticipated to be Ocean Tech's EOLOS FLS200 Light Detection and Ranging (LiDAR) buoy (see Section 4.0). The metocean buoy system will be comprised of a "simple and non-complex" device proven to operate effectively in open ocean conditions in support of offshore wind projects; the specific metocean buoy used has already been approved by BOEM (for the Vineyard Northeast Site Assessment Plan [SAP]). The metocean buoy will be moored to the seafloor using a single chain to avoid entanglement. A supplemental wave and current sensor (referred to as a Trawl Resistant Bottom Mount [TRBM]) will also be installed on the seafloor within SAP-1 or SAP-2, approximately 100 m (328 ft) from the metocean buoy. In addition to initial metocean buoy and TRBM installation, the activities proposed could include recovery and/or replacement of the metocean buoy at the same location if maintenance or repair is needed. Recovery and replacement of the TRBM will typically occur at six-month intervals, allowing for data downloads and refurbishment. Further performance standards for the equipment are described in Sections 4.0 and 9.0.

The information collected from the metocean buoy and TRBM will be used to further assess the wind resources and ocean conditions on the Lease, to supplement existing metocean measurement data available in the vicinity of the NYB WEA. Historical and ongoing collection of meteorological and oceanographic data in the region will inform the Construction and Operations Plan (COP) submittal and engineering of the wind turbine generators (WTGs) in support of development activities on the Lease Area.

2.2 Locations and Schedule

Two 300 meter (m) by 300 m (984 ft by 984 ft) study areas (SAP-1 and SAP-2), within which the metocean buoy and TRBM will be located, are shown on Figure 2.1-2. Coordinates and water depths at the center point of each study area are presented below.

SAP-1 (Southwest)	SAP-2 (Northeast)
Latitude: 40 14 07.2636 N	Latitude: 40 15 08.5716 N
Longitude: 73 06 17.3592 W	Longitude: 73 03 40.7376 W
Depth: 42.0 m (137.8 ft) Mean lower low water (MLLW)	Depth (m): 43.0 m (141.1 ft) MLLW

Note: geodetic position format = dd mm ss.sssss, where d=degrees, m=minutes, s=seconds

A geodatabase/shapefile for the Location Plat (Figure 2.1-2), compliant with BOEM's guidelines, is provided separately with the SAP submission.

Installation of the metocean buoy and TRBM is planned for February 2024. The installation process is expected to take up to two weeks, from arrival and onshore testing of the equipment and testing at the onshore staging area in Avalon, New Jersey (NJ) (shown on Figure 2.1-1) to the time the metocean buoy and TRBM are deployed at a location and the metocean buoy's

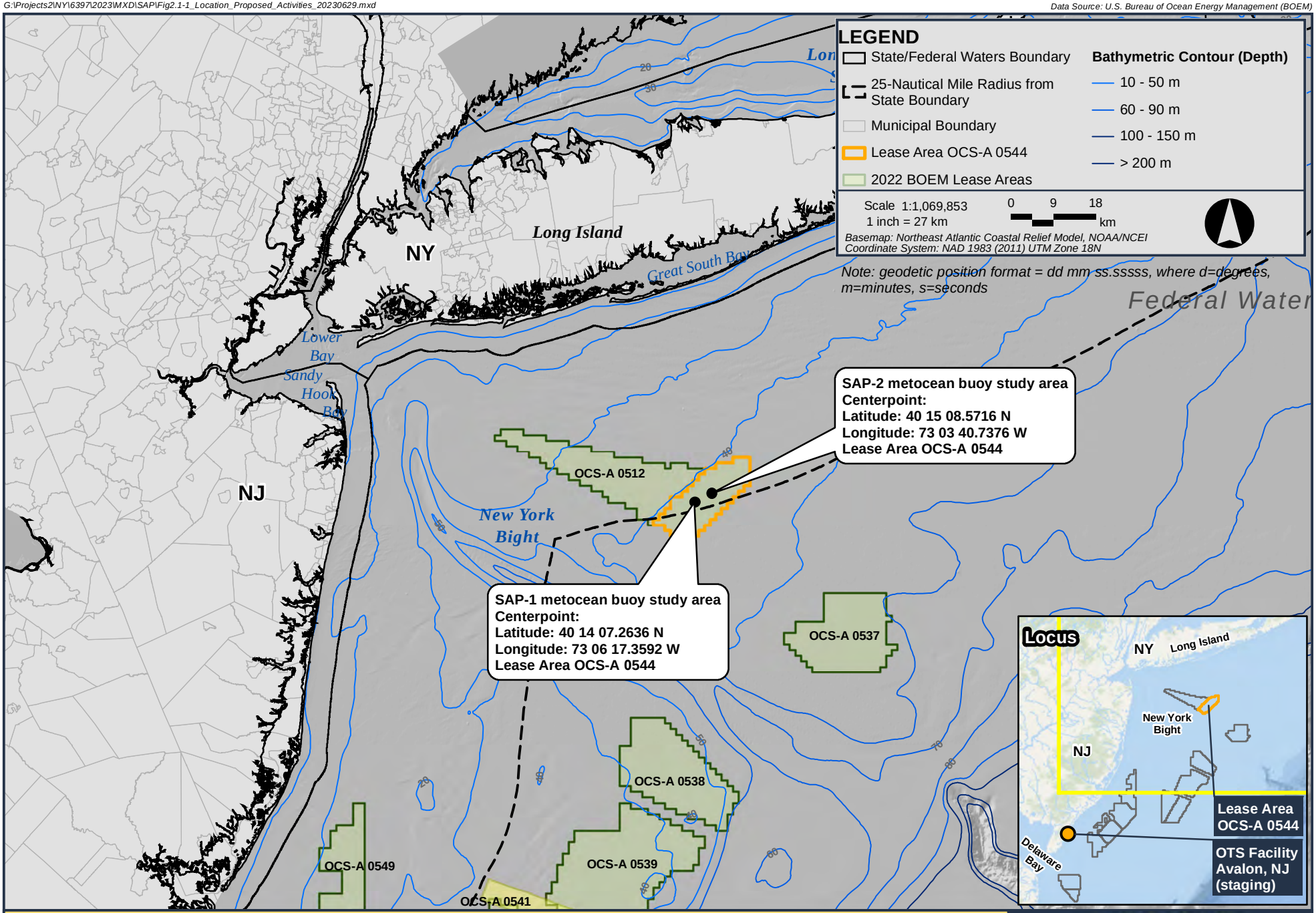

Figure 2.1-1
Location of Proposed Activities

VINEYARD MID-ATLANTIC

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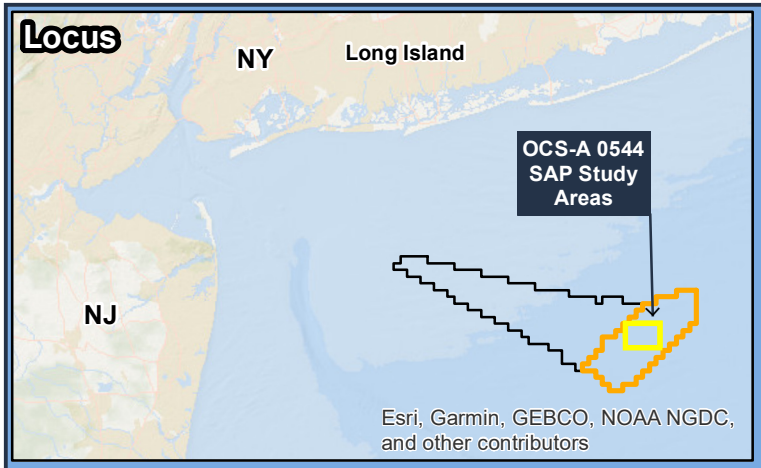

LEGEND

- SAP-1 metocean buoy study area
- SAP-2 metocean buoy study area
- Lease Area OCS-A 0544
- 2022 BOEM Lease Areas

Scale 1:24,000
1 inch = 2,000 feet

0 1,000 2,000 Feet

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI
Coordinate System: NAD 1983 (2011) UTM Zone 18N

Note: geodetic position format = dd mm ss.sssss, where d=degrees, m=minutes, s=seconds

Centerpoint of SAP-2 metocean buoy study area:
Latitude: 40 15 08.5716 N
Longitude: 73 03 40.7376 W
Lease Area OCS-A 0544

Centerpoint of SAP-1 metocean buoy study area:
Latitude: 40 14 07.2636 N
Longitude: 73 06 17.3592 W
Lease Area OCS-A 0544

Figure 2.1-2
Location Plat

VINEYARD MID-ATLANTIC

VINEYARD OFFSHORE

mooring weight is placed on the seafloor. No modifications of the onshore staging area are required. The total duration of the metocean buoy and TRBM offshore deployment for data collection is expected to be two years, but could last up to five years, coinciding with the site assessment term of the Lease.

2.3 Authorized Representative and Designated Operator

Rachel Pachter, Chief Development Officer, Vineyard Offshore
200 Clarendon Street, 18th floor
Boston, Massachusetts (MA) 02116
Tel: 508-717-8964; e-mail: **rpachter@vineyardoffshore.com**

The Proponent intends to be the sole operator of the metocean buoy and TRBM and will comply with the applicable stipulations stated in the Lease and regulations, as described in Section 3.0, as they relate to the BOEM-approved Site Assessment Survey Plan and proposed SAP activities.

2.4 Certified Verification Agent (CVA)

The type of metocean buoy selected by the Proponent is a standardized, proven, widely used and commercially available device and has been successfully deployed and operated in support of offshore wind projects in similar conditions to Lease Area OCS-A 0544. The metocean buoy type uses the best available and safest technology, does not require multi-point moorings or include new or uncommon technology, and therefore will not be "complex or significant" as defined on page eight of BOEM's Guidelines for Information Requirements for a Renewable Energy Site Assessment Plan (SAP), revised June 2019 (referred to hereafter as BOEM's 2019 SAP Guidelines). The mooring design has been checked and assessed by the Proponent. In addition, all installation and maintenance activities will be performed under supervision by key experts representing the Proponent. Similarly, the TRBM is a common and non-complex wave and current sensor that is placed on the seafloor and ballasted with lead. Accordingly, the nomination of a CVA is not required for this SAP activity. The Proponent hereby requests a waiver of the CVA requirement according to 30 Code of Federal Regulations (CFR) §585.610(a)(9) and 585.705(c).

2.5 Financial Assurance Information

In compliance with BOEM regulations at 30 CFR §585.610(a)(15), prior to SAP approval the Proponent will provide a Surety Bond issued by a primary financial institution or other approved security, as required in 30 CFR §585.515 and 30 CFR §585.516, to guarantee the commissioning obligation.

3.0 CONFORMANCE WITH APPLICABLE REGULATIONS, SAP GUIDANCE AND COMMERCIAL LEASE

3.1 Regulatory Framework

This SAP has been prepared and activities will be conducted by the Proponent in conformance with the following:

- Applicable regulations at 30 CFR §Part 585, entitled Renewable Energy and Alternate Uses of Existing Facilities on the Outer Continental Shelf;
- BOEM's Guidelines for Information Requirements for a Renewable Energy Site Assessment Plan (SAP) dated June 2019;
- Applicable terms of the Lease issued by BOEM for Lease Area OCS-A 0544; and
- Future terms and conditions of SAP approval.

In 2022, the Proponent completed field surveys across its Lease Area OCS-A 0544 in accordance with a pre-survey meeting with BOEM and the Proponent's BOEM-approved COP Survey Plan (see Section 8.0 and related appendices). The field surveys specific to the SAP study areas which will contain the metocean buoy and TRBM are detailed in Section 8.0 and related appendices; results of applicable resource assessments are summarized in Section 9.0 and relevant appendices.

The Proponent will conduct its proposed site assessment activities for the metocean buoy and TRBM in compliance with 30 CFR §585.606(a)(2 through 4) in a manner that conforms to all applicable laws, regulations, and Lease provisions for OCS-A 0544; is safe; does not reasonably interfere with other uses of the OCS; does not cause undue harm, to the extent practicable, to natural resources, life, property, the environment, or resources of historical or archaeological significance; uses BOEM's SAP best available and safest technology; complies with BOEM's applicable federal regulations (Table 3.1-1), applicable Lease stipulations (Table 3.1-2), uses best management practices (see Table 9.9-1); and uses properly trained personnel. The Proponent will take suitable measures, including briefing all SAP offshore support staff, to prevent unauthorized discharge of pollutants including marine trash and debris into the offshore environment. Table 3.1-1 lists relevant BOEM regulations and where the corresponding information can be found in this SAP.

Table 3.1-1 Lease Area OCS-A 0544 SAP Regulatory Crosswalk Table

Regulatory Requirement	Location of Information in SAP
30 CFR §585.605(a,b,&d)	
585.605(a) Describe the activities you plan to perform for the characterization of your commercial lease, including your project easement, or to test technology devices.	Section 2.1 Sections 4.0 through 8.0
585.605(a)(1) Describe how you will conduct your resource assessment	Section 8.0 and cited Appendices
585.605(b) Include data from physical characterization surveys and baseline environmental surveys	Sections 8.0 and 9.0 and cited Appendices
585.605(d) If the facilities are complex or significant, you must also comply with the requirements of subpart G of this part and submit your Safety Management System as required by § 585.810.	The metocean buoy and TRBM are not "complex or significant".
30 CFR §585.606	
585.606(a)(1) The project conforms to all applicable laws, regulations, and lease provisions of your commercial lease;	Section 3.1
585.606(a)(2) The project is safe;	Section 3.1
585.606(a)(3) The project does not unreasonably interfere with other uses of the OCS, including those involved with National security or defense;	Section 3.1 and Table 3.3-1
585.606(a)(4) The project does not cause undue harm or damage to natural resources; life (including human and wildlife); property; the marine, coastal, or human environment; or sites, structures, or objects of historical or archaeological significance;	Sections 3.1 and 9.0 and cited Appendices
585.606(a)(5) The project uses best available and safest technology;	Sections 2.4 and 3.1
585.606(a)(6) The project uses best management practices;	Sections 3.1, Table 9.9-1
585.606(a)(7) Uses properly trained personnel.	Section 3.1
585.606(b) The site assessment activities will collect all information needed for your COP	Section 3.1
30 CFR §585.610(a)(1-16)	
585.610(a)(1) Contact Information	Section 2.3
585.610(a)(2) The site assessment or technology testing concept	Section 2.1
585.610(a)(3) Designation of operator, if applicable	Section 2.3

Table 3.1-1 Lease Area OCS-A 0544 SAP Regulatory Crosswalk Table (Continued)

Regulatory Requirement	Location of Information in SAP
30 CFR §585.610(a)(1-16)	
585.610(a)(4) Commercial lease stipulations and compliance	Table 3.1-2, Sections 9.8; 9.9, Table 9.9-1
585.610(a)(5) A location plat	Section 2.2 Figures 2.1-1 and 2.1-2
585.610(a)(6) General structural and project design, fabrication, and installation	Section 2.1 Section 4.0 Section 5.0 Appendix A
585.610(a)(7) Deployment activities	Section 5.0
585.610(a)(8) Your proposed measures for avoiding, minimizing, reducing, eliminating, and monitoring environmental impacts	Sections 4.1, 4.2 and 4.4 Sections 5.2, 6.3, 7.2 Section 9.0 and Table 9.9-1
585.610(a)(9) CVA nomination, if required	Section 2.4; the Proponent requests a waiver of the CVA requirement
30 CFR §585.610(a)(1-16)	
585.610(a)(10) Reference information	Section 10.0
585.610(a)(11) Decommissioning and site clearance procedures	Section 7.0
30 CFR §585.610(a)(1-16)	
585.610(a)(12) Air quality information (refers to 585.659: comply with Environmental Protection Agency (EPA) Clean Air Act and implementing regulations)	Section 9.7
585.610(a)(13) A listing of all Federal, State, and local authorizations or approvals required to conduct site assessment activities on your lease	Sections 3.1, 3.3 Table 3.3-1
585.610(a)(14) A list of agencies and persons with whom you have communicated, or with whom you will communicate, regarding potential impacts associated with your proposed activities	Section 3.0: 3.2, 3.3, 3.4
585.610(a)(15) Financial assurance information	Section 2.5
585.610(a)(16) Other information	None

Table 3.1-1 Lease Area OCS-A 0544 SAP Regulatory Crosswalk Table (Continued)

Regulatory Requirement	Location of Information in SAP
30 CFR §585.610(b)(1-5)	
585.610(b)(1) Geotechnical – The results from the geotechnical survey with supporting data	Sections 8.0, 9.2 Appendix B
585.610(b)(2) Shallow hazards – The results from the shallow hazards survey with supporting data	Sections 8.0, 9.6 Appendix B
585.610(b)(3) Archaeological – The results from the archaeological survey with supporting data, if required	Sections 8.0, 9.5 Appendix C
585.610(b)(4) Geological survey – The results from the geological survey with supporting data	Sections 8.2, 9.2 Appendix B
585.610(b)(5) Biological survey – The results from the biological survey with supporting data	Sections 8.2, 9.4 Appendix D
30 CFR §585.611 National Environmental Policy Act (NEPA)	**See Table 9.9-1 for measures to minimize impacts to categorically excluded resources per BOEM's 2019 SAP Guidance**
585.611(b)(1) Hazard information	Section 8.0 Section 9.0
585.611(b)(2) Water quality	See Section 3.2: Categorically excluded per BOEM 2019 Guidance and 30 CFR §585.611(b).
30 CFR §585.611 NEPA	**See Table 9.9-1 for measures to minimize impacts to categorically excluded resources per BOEM's 2019 SAP Guidance**
585.611(b)(3) Biological resources	See Section 3.2: Categorically excluded per BOEM 2019 Guidance and 30 CFR §585.611(b); Addressed in Sections 8.5 and 9.4 and Appendix D under 30 CFR §585.610(b)5)
585.611(b)(4) Threatened or endangered species	See Section 3.2: Categorically excluded per BOEM 2019 Guidance and 30 CFR §585.611(b).
585.611(b)(5) Sensitive biological resources or habitats	See Section 3.2: Categorically excluded per BOEM 2019 Guidance and 30 CFR §585.611(b). Addressed in Sections 8.5 and 9.4 and Appendix D.

Table 3.1-1 Lease Area OCS-A 0544 SAP Regulatory Crosswalk Table (Continued)

Regulatory Requirement	Location of Information in SAP
585.611(b)(6) Archaeological resources	See Section 3.2: Categorically excluded per BOEM 2019 Guidance and 30 CFR §585.611(b). Addressed in Sections 8.4, 9.6 and Appendix C under 30 CFR §585.610(b)(5)
585.611(b)(7) Social and economic conditions	See Section 3.2: Categorically excluded per BOEM 2019 Guidance and 30 CFR §585.611(b).
585.611(b)(8) Coastal and marine uses	See Section 3.2: Categorically excluded per BOEM 2019 Guidance and 30 CFR §585.611(b).
585.611(b)(9) Consistency Certification	See Section 3.2: Categorically excluded per BOEM 2019 Guidance and 30 CFR §585.611(b).
585.611(b)(10) Other resources, conditions, and activities	See Section 3.2: Categorically excluded per BOEM 2019 Guidance and 30 CFR §585.611(b).

Table 3.1-2 demonstrates compliance with the commercial stipulations relevant to this SAP in BOEM's *Commercial Lease of Submerged Land for Renewable Energy Development on the Outer Continental Shelf* for Lease Area OCS-A 0544 (effective date May 1, 2022). Lease stipulations pertaining to minimizing impacts to marine resources are listed in Sections 9.8, 9.9, and Table 9.9-1. The Proponent will comply with the Lease stipulations described in Section 9.9 and in Table 9.9-1.

Table 3.1-2 Summary of Lease Area OCS-A 0544 Commercial Lease Stipulations and Compliance

Stipulation	Compliance
Section 4(a): The Lessee must make all rent payments to the Lessor in accordance with applicable regulations in 30 CFR Part 585, unless otherwise specified in Addendum "B."	The Proponent has made and will continue to make all rent payments in accordance with applicable regulations, unless otherwise specified in Addendum "B".
Section 4(b): The Lessee must make all operating fee payments to the Lessor in accordance with applicable regulations in 30 CFR Part 585, as specified in Addendum "B.	The Proponent will make all operating fee payments in accordance with applicable regulations.

Table 3.1-2 Summary of Lease Area OCS-A 0544 Commercial Lease Stipulations and Compliance (Continued)

Stipulation	Compliance
Section 5: The Lessee may conduct those activities described in Addendum "A" only in accordance with a SAP or COP approved by the Lessor. The Lessee may not deviate from an approved SAP or COP except as provided in applicable regulations in 30 CFR Part 585.	The Proponent will conduct activities as described in the SAP.
Section 7: The Lessee must conduct, and agrees to conduct, all activities in the leased area and project easement(s) in accordance with an approved SAP or COP, and with all applicable laws and regulations. The Lessee further agrees that no activities authorized by this lease will be carried out in a manner that: could unreasonably interfere with or endanger activities or operations carried out under any lease or grant issued or maintained pursuant to the Act, or under any other license or approval from any Federal agency; could cause any undue harm or damage to the environment; could create hazardous or unsafe conditions; or could adversely affect sites structures, or objects of historical, cultural, or archaeological significance, without notice to and direction from the Lessor on how to proceed.	The Proponent will conduct all activities in the leased area in accordance with the SAP and all applicable laws and regulations. (a) See Section 9.9.4 (b) See Sections 8.0, 9.0 (c) See Sections 4.1, 4.3, 6.2, 8, 9 (d) See Sections 8.0, 9.0
Section 10: The Lessee must provide and maintain at all times a surety bond(s) or other form(s) of financial assurance approved by the Lessor in the amount specified in Addendum "B."	The portions of the Lease development activities in federal waters will be covered by financial assurance in amounts and within time frames approved by BOEM and in accordance with Addendum "B," Section IV of the Lease. See Section 2.5.
Section 13: Unless otherwise authorized by the Lessor, pursuant to the applicable regulations in 30 CFR Part 585, the Lessee must remove or decommission all facilities, projects, cables, pipelines, and obstructions and clear the seafloor of all obstructions created by activities on the leased area and project easement(s) within two years following lease termination, whether by	Preliminary decommissioning plans are described in Section 7.0. Decommissioning will be in accordance with the applicable regulations.

Table 3.1-2 Summary of Lease Area OCS-A 0544 Commercial Lease Stipulations and Compliance (Continued)

Stipulation	Compliance
expiration, cancellation, contraction, or relinquishment, in accordance with any approved SAP, COP, or approved Decommissioning Application, and applicable regulations in 30 CFR Part 585.	
Section 14: The Lessee must: maintain all places of employment for activities authorized under this lease in compliance with occupational safety and health standards and, in addition, free from recognized hazards to employees of the Lessee or of any contractor or subcontractor operating under this lease; maintain all operations within the leased area and project easement(s) in compliance with regulations in 30 CFR Part 585 and orders from the Lessor and other Federal agencies with jurisdiction, intended to protect persons, property, and the environment on the OCS; and provide any requested documents and records, which are pertinent to occupational or public health, safety, or environmental protection, and allow prompt access, at the site of any operation or activity conducted under this lease, to any inspector authorized by the Lessor or other Federal agency with jurisdiction.	The Proponent will maintain all places of employment in compliance with applicable standards. The Proponent will maintain all operations in the leased area in compliance with applicable regulations. The Proponent will provide any requested pertinent documents and records.
Section 15: The Lessee must comply with the Department of the Interior's non-procurement debarment and suspension regulations set forth in 2 CFR Parts 180 and 1400 and must communicate the requirement to comply with these regulations to persons with whom it does business related to this lease by including this requirement in all relevant contracts and transactions.	The Proponent will comply with the applicable Department and suspension regulations.
Section 16: During the performance of this lease, the Lessee must fully comply with paragraphs (1) through (7) of Section 202 of Executive Order 11246, as amended (reprinted in 41 CFR 60-1.4(a)),	The Proponent will fully comply with paragraphs (1) through (7) of section 202 of Executive Order 11246, as amended.

Table 3.1-2 Summary of Lease Area OCS-A 0544 Commercial Lease Stipulations and Compliance (Continued)

Stipulation	Compliance
and the implementing regulations, which are for the purpose of preventing employment discrimination against persons on the basis of race, color, religion, sex, or national origin.	
Addendum "B," Section III (Payments): Unless otherwise authorized by the Lessor in accordance with the applicable regulations in 30 CFR Part 585, the Lessee must make payments as described below.	The Proponent will make payments as stipulated in Addendum "B," Section III.
Addendum "B," Section IV (Financial Assurance Amounts): The Lessor reserves the right to adjust the amount of any financial assurance and will notify the Lessee of any intended adjustment.	See Section 2.5: Financial Assurance Information
Addendum "C" Sections 3 (Reporting) and 5 (Standard Operating Conditions):	
Section 3.1: Progress Reporting	
3.1.2 Communication Plans: The Lessee must develop a publicly accessible Draft Fisheries Communication Plan, Native American Tribes Communication Plan and Agency Communication Plan.	The Lessee has developed a draft Fisheries Communication Plan (see Section 8.9.2) and an Agency Communication Plan. BOEM is coordinating with the Lessees who hold New Bight Lessees to develop a Native American Tribes Communication Plan.
Section 5.1: General Requirements	
5.1.3: The Lessee must ensure that a copy of ADDENDUM "C" and the Project Design Criteria and Best Management Practices listed in Appendix B of the NMFS Letter of Concurrence issued by the National Marine Fisheries Service (NMFS) on June 29, 2021, is made available on every project-related vessel.	The Lessee will provide a copy of the Project Design Criteria (PDCs) and Best Management Practices (BMPs) on every project-related vessel.
Section 5.3: Archaeological Survey Requirements	
5.3.1-5.3.2 Archaeological Survey: Lessee must provide the results of an archaeological survey with its plans, prepared by a Qualified Marine Archaeologist (QMA)	See Sections 8.4, 9.5, and Appendix C
5.3.3 Tribal Pre-Survey Meeting: Lessee must hold a pre-survey meeting inviting involved tribal representatives, to inform them of planned SAP activities.	See Section 3.4 Consultations and Meetings. Tribal pre-survey meetings were held in June and July 2022.

Table 3.1-2 Summary of Lease Area OCS-A 0544 Commercial Lease Stipulations and Compliance (Continued)

Stipulation	Compliance
5.3.4-5.3.6 QMA Review before Disturbance: Lessee must only conduct geotechnical activities where analysis of geophysical survey has been completed and reviewed by a QMA to assess the presence/absence of potential historic properties prior to ground disturbance.	See Sections 8.4, 9.5, and Appendix C
5.3.7 Post-Review Discovery Clauses: Lessee must follow a specific notification process if unanticipated potential archaeological resources are discovered during SAP activities.	See Sections 8.4, 9.6, and Appendix C
Section 5.4: Avian and Bat Survey and Reporting Requirements	
5.4.1 Lighting:[1] The Lessee must ensure any lights used to aid marine navigation must meet USGG requirements. Any additional lighting must be used only when necessary and must be hooded downwards when possible.	See Section 6.1.
5.4.2 Motus Wildlife Tracking System: The Lessee must install Motus stations on meteorological buoys in coordination with U.S. Fish and Wildlife Service's Offshore Motus network.	See Section 6.1

Notes:

1. This text summarizes stipulations in Lease OCS-A 0544 (effective date May 1, 2022). The Proponent understands that the United States Coast Guard (USCG) has worked with BOEM to develop standard language for use in COP and/or SAP approvals and that the conditions of SAP approval will supersede the Lease stipulations. The Proponent understands that the USCG's suggested standard language is: "Nothing in this condition supersedes or is intended to conflict with the lighting, marking, and signaling requirements of the Federal Aviation Administration (FAA), United States Coast Guard (USCG), or BOEM. The Lessee must use lighting technology that minimizes impacts on avian species to the extent practicable including lighting designed to minimize upward illumination."

3.2 SAP Format and Categorical Exclusions for Portions of NEPA Analysis

The SAP is in conformance with the 2019 BOEM issued SAP report template specifically for "non-complex" metocean buoys (included as Attachment C of BOEM's 2019 SAP Guidelines).

In 2021, BOEM completed a Final Environmental Assessment (EA) for Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore New York Bight (OCS EIS/EA BOEM 2021-073), which is referred to herein as the "NYB EA." 30 CFR §585.611(b) and BOEM's 2019 SAP Guidelines (Section IV.1) allow BOEM to consider previous analyses of site assessment activities in the assessment of proposed SAP activities:

- **Metocean Buoy:** If a lessee is proposing the installation and operation of metocean buoy in an area where BOEM has previously analyzed such activities under NEPA, then regulatory requirements in 585.611(b)(2 through 10) will likely not be applicable. Regulatory requirements in 585.611(b)(1) may be applicable for BOEM technical review outside of NEPA.

The scope of the NEPA analyses conducted by BOEM as part of the NYB EA included site assessment activities for up to 20 metocean buoys on leases to be issued within the WEA. The NYB EA resulted in a Finding of No Significant Impact for the activities under the EA's purview.

As shown in Table 3.2-1, the scope and assessment of the proposed metocean buoy are consistent with the scope and assessment of the site assessment activities previously analyzed by BOEM as part of the NYB EA.

Table 3.2-1 Consistency of Proposed SAP with New York Bight EA

Component	New York Bight EA	Proposed SAP	Consistency
Number of Buoys	One to two buoys per lease	One buoy	One proposed buoy is consistent with the scope of the EA
Meteorological Buoy Height	Generally less than 12 m (39 ft) above sea level	Approximately 5.3 m (17 ft) above sea level	The height is consistent with the expected height evaluated in the EA
Meteorological Boat and Discus Shaped Buoy Mooring (Anchor) Weight1	Approximately 2,721 – 4,536 kg (6,000 - 10,000 lbs)	Approximately 5,000 kg (11,023 lbs)	The weight of the anchor proposed is similar to that evaluated in the EA
Meteorological Boat and Discus Shaped Buoy Mooring Weight (Anchor) Footprint	Approximately 0.5 m^2 (six square feet [SF])	Approximately 1.8 m^2 (19.38 SF)	The proposed anchor footprint is comparable to that evaluated in the EA (which considered spar-type buoy footprints of up to 45 m^2 [484 SF])

[1] While not anticipated to be used, spar-type metocean buoys evaluated by BOEM were approximately 100 tons, with an anchor weight footprint of 484 SF, and a seafloor disturbance area of 1,268 SF.

Table 3.2-1 Consistency of Proposed SAP with New York Bight EA (Continued)

Component	New York Bight EA	Proposed SAP	Consistency
Boat and Discus Shaped Mooring Weight (Anchor) Sweep Area	0.034 km ^{2} (8.5 acres)	With a 71m (234 ft) radius, the anchor sweep area is estimated to be approximately 0.016 km^2 (4.0 acres)	The anchor sweep area is within the sweep area evaluated in the EA.
Anchoring During Meteorological Buoy Installation	The EA assumed additional seafloor impacts from vessel anchoring during installation	No vessel anchoring is proposed during installation	The amount of seafloor disturbance is less than area evaluated in the EA
Data Collection & Transmission	Assumed a small, tethered buoy with Acoustic Doppler Current Profilers (ADCP). LiDAR, Sonic Detection and Ranging (SODAR), and Coastal Ocean Dynamic Applications Radar (CODAR) technologies could be used.	The buoy will use LiDAR and ADCP.	The data collection and transmission requirements are consistent with the scope of the EA.
Installation and Decommissioning	Estimated to take approximately one to two days to install and remove using a barge, tug, or similar vessel assuming a vessel speed of 4.5 knots during a ten-hr day.	Estimated to require approximately one day with one work boat for installation and decommissioning assuming a vessel speed of nine to ten knots.	The proposed timeline is comparable to the timeline evaluated in the EA.

Given that the scope and assessment of the proposed metocean buoy are consistent with the scope and assessment of the site assessment activities previously analyzed by BOEM as part of the NYB EA, the categories and resources in 30 CFR §585.611(b)(2 through 10), which are listed below, can be excluded from duplicative analyses[2]. These categories are therefore not assessed in the SAP except where noted:

- Water quality (Note: shallow hazards, including sediment transport, are required to be analyzed under 30 CFR §585.610(b)(2); see Sections 8.0 and 9.0 for a description of sediment transport);
- Biological resources (Note: biological resources are required to be analyzed under 30 CFR §585.610(b)(5); see Sections 8.5 and 9.4 and Appendix D for a description and assessment of the seafloor community);
- Threatened or endangered species (Note: biological resources are required to be analyzed under 30 CFR §585.610(b)(5); see Section 9.8 and Tables 9.8-1 and 9.9-1 for protected species avoidance measures);
- Sensitive biological resources or habitats (Note: biological resources are required to be analyzed under 30 CFR §585.610(b)(5); see Sections 8.5 and 9.4 and Appendix D);
- Archaeological resources (Note: archaeological resources are required to be analyzed under 30 CFR §585.610(b)(3); see Sections 8.4 and 9.6 and Appendix C);
- Social and economic conditions;
- Coastal and marine uses; and
- Consistency certification.

3.3 Regulatory Permits and Approvals

The Proponent will apply for the following approvals and/or authorizations shown in Table 3.3-1 to conduct site assessment activities (metocean buoy and TRBM installation, operation, and decommissioning).

[2] The TRBM is a common and non-complex wave and current sensor and so does not affect the categories to be analyzed in the SAP.

Table 3.3-1 Lease Area OCS-A 0544 SAP Permitting Plan

Permitting Agency	Applicable Permit or Approval	Statutory Basis And Implementing Regulations	Status
BOEM	Site Assessment Plan (SAP) Approval BOEM will conduct National Historic Preservation Act Review & State Historic Preservation Act Consultation	30 CFR § 585.600-618-	Filed March 2023
	National Historic Preservation Act (NHPA) Section 106 Consultation/ Abandoned Shipwreck Act	NHPA 16 U.S.C. 470 36 CFR Part 60, Part 800	An archaeological assessment was prepared to support the SAP (Appendix C). The activities proposed in the SAP
BOEM		43 U.S.C §§ 2101-2106, *et seq*	will have no impact on submerged pre- or post-contact period historic properties or preserved ancient submerged landforms
NMFS	Endangered Species Act (ESA) Section 7 Consultation	50 United States Code (U.S.C) 1536 50 CFR § 402	No additional action required. The activities proposed in the SAP are within the scope of BOEM's prior consultation with NMFS and outlined in the June 29, 2021 Letter of Concurrence (See Section 9.8.1).
NMFS	Incidental Take Authorization	Marine Mammal Protection Act of 1972 16 U.S.C §§ 1361, et seq.	Incidental Harassment Authorization (IHA) for geophysical and geotechnical survey work issued July 27, 2022 (1-year term). New IHA issued July 27, 2023 (1-year term).
	Magnuson-Stevens Fishery Conservation and Management Act	16 U.S.C 1801 50 CFR 600	No additional action required. The SAP implements conservation measures suggested by NMFS during consultation to minimize impacts on essential fish habitat and sensitive habitats.

Table 3.3-1 Lease Area OCS-A 0544 SAP Permitting Plan (Continued)

Permitting Agency	Applicable Permit or Approval	Statutory Basis And Implementing Regulations	Status
US Army Corps of Engineers (USACE)	Section 10/404 Permit via Nationwide Permit 5: Scientific Collection Device	Clean Water Act 33 U.S.C. 134 33 CFR § 320	Filed with the USACE on September 5, 2023
US Coast Guard (USCG)	Private Aid to Navigation	14 U.S.C 81 33 CFR § 66	Expected filing date Winter (Q1) 2024
US Fish and Wildlife Service (USFWS)	ESA Section 7 Consultation	50 U.S.C 1536 50 CFR § 402	No additional action required. The activities proposed in the SAP are within the scope of BOEM's prior consultation with USFWS.
New York Department of State, Division of Coastal Resources New Jersey Department of Environmental Protection	Federal consistency review	Coastal Zone Management Act of 1972 (16 USC 1451 et seq.); 15 CFR 930 Subpart C	No additional action required. BOEM provided a final Coastal Zone Consistency Determination (CD) for SAP activities in the New York Bight Wind Energy Areas to New York and New Jersey on August 18, 2021. New Jersey provided no response; therefore, BOEM presumed concurrence. New York provided concurrence.[1]

Notes:

1. A separate Consistency Assessment Form was submitted on September 5, 2023 to New York Department of State as part of the USACE Nationwide Permit 5 application process, and approval was granted on October 26, 2023 (see Appendix E).

3.4 Consultations and Meetings

The Proponent has conducted or will conduct outreach with the following local, state, and federal agencies via meetings and/or correspondence. This outreach will address planned site assessment and development activities in the Lease Area, including the proposed metocean buoy and TRBM. These agencies include:

- BOEM
- NMFS
- USACE
- USCG, District Commander

- Department of Defense (DoD), US Navy – Fleet Forces

As outlined in Table 3.4-1, the Proponent met with USACE on April 11, 2023, USCG on March 21 and April 25, 2023, and NMFS on April 13, 2023, and informed each agency of the plan to deploy a metocean buoy. Most outreach to the agencies has been through verbal communication during meetings advising of the buoy deployment and the Proponent did not request feedback in writing.

Table 3.4-1 Agency Communication

Date	Meeting Title	Entity	Topics of Discussions
March 21, 2023	Vineyard Mid-Atlantic Lease Area 544	USCG	Pre-COP filing project overview; navigation constraints; OECC constraints; SAP
April 11, 2023	Vineyard Offshore/VMA Lease Development Discussion with USACE-NY	USACE	Pre-COP filing project overview; OECC constraints; SAP
April 13, 2023	Vineyard Offshore Lease 544 Discussion with NMFS	NMFS	Pre-COP filing project overview; habitat type; fisheries; aquatic resources; SAP
April 25, 2023	VO Lease 544 Update - Coast Guard	USCG	OECC routes; Navigation Safety Risk Assessment preparation; WTG layout; SAP

Furthermore, prior to conducting SAP survey activities (as specified in the Lease Section 5.3.3) the Proponent held a pre-survey meeting on June 27, June 28, and July 6, 2022, and invited members of the federally recognized Wampanoag Tribe of Gay Head/Aquinnah, the Mashpee Wampanoag Tribe, the Narragansett Indian Tribe, the Mashantucket Pequot Tribal Nation, the Mohegan Tribe of Indians of Connecticut, and the Shinnecock Indian Nation. Only Representatives of Wampanoag Tribe of Gay Head/Aquinnah, the Mashpee Wampanoag Tribe and Shinnecock Indian Nation responded and attended.

As noted in the NYB EA, the Proponent will adhere to USCG and BOEM structural lighting requirements for the metocean buoy to minimize collision risks in the Narragansett Bay operating area (OPAREA).

4.0 PROJECT EQUIPMENT AND PERFORMANCE STANDARDS

The following sections describe the performance standards and constraints that the metocean buoy equipment will meet.

4.1 Equipment

The Proponent has selected a proven multi-purpose non-complex metocean buoy, which has previously been approved by BOEM (for the Vineyard Northeast SAP, approved July 1, 2022), that meets or exceeds all performance standards set by BOEM for this type of marine measuring device and is tailored for the renewable energy industry and open Atlantic Ocean conditions. The metocean buoy will accurately measure and collect wind profiles (speed and direction) at different heights within a vertical measurement cone projected above the metocean buoy. Within the cone, wind data can be obtained at varying heights, including heights of the blade spans of the planned offshore wind turbines. The metocean buoy is equipped with oceanographic sensors that can obtain ocean wave height and direction data, and current profiles from the sea surface to the seabed. The information collected by the metocean buoy will be utilized to assess site-specific wind resources and assist in developing engineering design criteria for the development activities in the Lease Area. The mooring chain is designed to resist abrasion and corrosion to last through the maximum deployment period of five years. Regular maintenance will include inspection of the mooring chain, similar to USCG's inspection routines every two years. The metocean buoy will be easily deployed and relocated, either by towing or lifting on-board support vessels. The metocean buoy will conform to applicable USCG standards for special purpose buoys and will have a yellow hull. The metocean buoy will not utilize fuel oil to avoid the risk of accidental release and emissions into the environment.

The metocean buoy that will be deployed in Lease Area OCS-A 0544 is the Ocean Tech EOLOS FLS200 LiDAR Buoy (EOLOS buoy or EOLOS). A diagram of the EOLOS FLS200 buoy system is shown in Appendix A. In summary, the EOLOS is made of polyethylene, aluminum, and stainless steel, with a buoy weight of approximately 5,000 kg (11,023 lbs). The metocean buoy has a modular hull for easy assembly and transport, an overall height of 5.3 m (17.4 ft), is 4 m (13.1 ft) in length and width, and an overall mast height above water of 4.2 m (13.8 ft). The metocean buoy has 64 gigabytes (GB) of data storage; a real-time operating system; flexible data acquisition software; full on-board processing of all measured data; and real-time data transfer. The EOLOS buoy is powered by renewable energy, specifically solar panels and wind turbines, and is equipped with back-up batteries as well as a methanol fuel cell.

The TRBM platform is made of fiberglass and is ballasted with 140kg (309 lbs) of lead. It measures 0.6 m (2.0 ft) high, 1.8 m (5.9 ft) long, and 1.6 m (5.2 ft) wide, shown on Figure 4.2-1 It is expected the TRBM will contain a Nortek AWAC-600 and could contain other instrumentation packages as well.

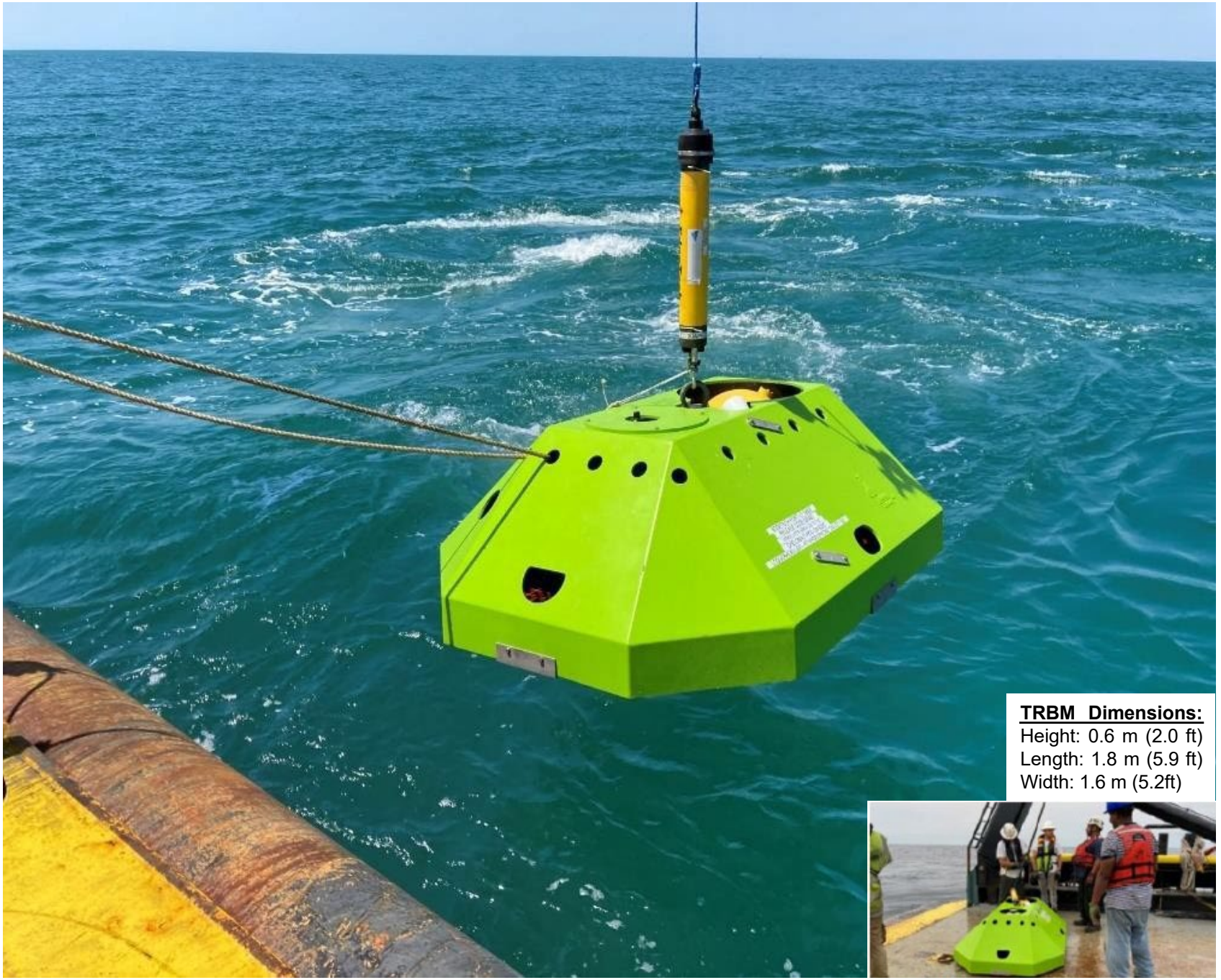

Figure 4.2-1
Picture of Trawl Resistant Bottom Mount

The metocean buoy will be equipped with the proper safety lighting, markings, and signal equipment per USCG Private Aids to Navigation (PATON) requirements. Tracking of the metocean buoy will be done by means of Global Positioning System (GPS) and Automatic Identification System (AIS) device. The location of the metocean buoy will be monitored daily. In addition, there will be up to three locator beacons that send alarms to the EOLOS data center when they are outside the designated metocean buoy watch circle. The Proponent will maintain a list of known and pre-validated vessel providers to assist. If immediate emergency recovery is necessary, the closest suitable recovery vessel will be contacted. Additional information should an emergency recovery be needed is provided in Section 6.2.

The metocean buoy system will be moored to the seafloor using a gravity-based single mooring weight. The proposed mooring "line" is a mooring chain and is expected to be under tension, which reduces entanglement risk. The length of the mooring chain utilized depends on the water depth but is the shortest possible, while still reliably securing the metocean buoy system. The mooring chain is designed to resist abrasion and corrosion to last through the five-year planned deployment period and will be regularly inspected for signs of abrasion and corrosion (see Section 6.2). Typical mooring weights consist of a cement, cast iron, or steel weight linked to the floating metocean buoy by a single chain to limit impacts to the seafloor (see Section 4.1); the proposed metocean buoy(s) will use a cast iron mooring weight.

4.2 Bottom Disturbance

The total seafloor impacts of the proposed metocean buoy system will be caused by a combination of the mooring weight, the mooring chain sweep zone; and the limited deep-water shallow marine sediments temporarily displaced below the mooring weight. The TRBM will also occupy a limited portion of the seafloor.

Metocean Buoy Mooring Weight: For the metocean buoy, the cast iron mooring weight will occupy an expected seafloor footprint of approximately 1.8 m x 1.4 m (5.9 ft x 4.6 ft), resulting in an area of 2.5 m^2 (27.1 SF). Upon placement on the seafloor, the mooring weight is expected to vertically penetrate the deep-water fine silty sands and silts to a depth of approximately 2.5 m (8.2 feet), displacing approximately 10 m^3 (13 cubic yards) of deep-water marine sediments.

As described in Section 9.2, the absence of any size of mobile seafloor features (ripples, megaripples, sand waves) suggests minimal bottom currents are operating in the area, and therefore scour around the weight is expected to be minimal.

Metocean Buoy Mooring Chain Sweep Zone: The majority of the mooring chain from the mooring weight will traverse the water column to secure the floating metocean buoy. A varying length of the mooring chain will likely rest at times upon the seafloor and sweep around the mooring weight as the floating metocean buoy is moved at the surface by winds, tides, and currents. The maximum length (radius) of mooring chain for the metocean buoy that could rest on the seafloor is estimated at 71.0 m (234 ft).

It should be noted that the seafloor impact of the mooring chain may not be fully radial around the mooring weight, as the metocean buoy will be preferentially directed by prevailing seasonal patterns. However, assuming the entire circumference is affected, the maximum estimated radial mooring chain sweep of seafloor that could be surficially and temporarily affected for the metocean buoy as the single chain moves across it is approximately 15,837 m^2 (170,466 SF; 3.91 acres). The sweep zone will be within the 300 m x 300 m (22 acre) (984 ft by 984 ft) study area assessed for each metocean buoy deployment location.

TRBM: The TRBM will occupy an expected seafloor footprint of approximately 1.8 m x 1.6 m (5.9 ft x 5.2), resulting in an area of 2.9 m^2 (31 SF). The TRBM is ballasted with 140 kg (309 lbs) of lead and will be placed on the seafloor, where it may settle a few inches into the seafloor.

No seafloor impacts will result from metocean buoy and TRBM support vessels as activities will be conducted without anchoring. The seafloor is expected to recover naturally from these minimal impacts; no mitigation is necessary.

4.3 Oil Spill Response Measures

As described in Section 4.1, neither the selected metocean buoy nor the TRBM will use fuel oil. Vessel trips to support the metocean buoy system and TRBM will be minimal and fuel spills are not expected, as vessels will be expected to comply with USCG regulations at 33 C.F.R. § 151 relating to the prevention and control of oil spills.

If a vessel spill did occur, it is likely to be small. According to the Bureau of Transportation Statistics (2023), between 2000 and 2021, the average oil spill size for vessels other than tank ships and tank barges in all U.S. waters was 382 liters (101 gallons). Because a diesel fuel or similar fuel spill of this size is expected to dissipate rapidly and evaporate within days, impacts to any affected resources would be short-term and localized to the vicinity of the spill.

The Proponent has identified three Oil Spill Response Organizations (OSROs) located in the vicinity of the Lease that are available to execute planned response measures, in the event of a release. While not under contract, in compliance with the SAP Guidance, these organizations are:

- Marine Spill Response Corporation (**www.msrc.org**)
- US Ecology (**www.usecology.com**)
- T&T Marine Salvage, Inc. (**www.teichmangroup.com**)

In the event of an oil spill, the Proponent's designated point of contact (POC) for the SAP activities will be Health, Safety, and Environmental Manager Geoffrey Neild (contact information 407-616-4760; **gneild@vineyardoffshore.com**).

An alternative POC will be Marine Liaison Jeannot Smith (contact information 904-613-0134; **jsmith@vineyardoffshore.com**). Within 24 hours of learning of an oil spill related to the SAP activities, the Proponent POC will contact the POCs identified at BOEM, the contracted OSRO, the captain of the subject vessel, if applicable, and any other appropriate officials or personnel. Efforts will be made to respond and minimize impacts of the spill in accordance with applicable laws. Appropriate documentation, including all relevant contact information and records of any oil spills, will be kept at the Proponent's office at 412 West 15th Street, New York, NY 10011.

Annually, the Proponent POC and alternate POC will conduct a notification drill to test the ability of the POCs to communicate pertinent information regarding the emergency situation and the necessary response measures to an OSRO and to BOEM.

5.0 DEPLOYMENT / INSTALLATION

5.1 Overview of Installation and Deployment Activities

It is anticipated that the deployment activities will be conducted from Ocean Tech Services' (OTS) waterfront facility in Avalon, NJ or a similar suitable port in the area (see Figure 2.1-1). No modifications to existing facilities at the selected port are anticipated.

Deployment and installation activities for the metocean buoy and TRBM that will operate in Lease Area OCS-A 0544 are expected to require approximately one day (including vessel transits) with one workboat making a single roundtrip. No vessel anchoring is expected. Mobilization is expected to occur at Avalon, NJ. The metocean buoy is expected to be lifted off the quay and onto the deck of the deployment vessel and secured with chain binders for transit. The mooring weight and mooring chain are expected to be secured onto the center deck of the vessel.

Transit time to the Lease Area is expected to take approximately twelve hours, one-way, at speeds of nine to ten knots. At the deployment location, the metocean buoy will be lifted off the deck of the vessel into the water, and the mooring weight will be lowered to its planned location on the seafloor. Similarly, the TRBM will be lifted off the deck of the vessel and placed on the seafloor. Confirmatory GPS measurements of the metocean buoy system will be obtained.

5.2 Reporting Requirements

The Proponent will report deployment and installation information about the metocean buoy and TRBM to BOEM as required in 30 CFR §585.615 and as specified in the SAP approval, when issued by BOEM. These include:

1. notifying BOEM in writing within 30 days of completing installation activities;

2. preparing and submitting an annual report to BOEM on November 1 of each operational year summarizing the site assessment activities and results; and

3. annual submission of a certification of compliance with certain terms and conditions of the SAP approval, including any mitigation measures and monitoring measures and their effectiveness.

The Proponent will also provide other notifications that may be required by other Federal agencies for metocean buoy and TRBM deployment.

6.0 OPERATIONS AND MAINTENANCE

6.1 Data Collection and Operations for Metocean Data:

During operation, the location of the metocean buoy will be tracked by GPS located on the top cover of the attached metocean buoy. In addition to this, there will be up to three locator beacons that send alerts to the EOLOS buoy data center when they are outside of the designated metocean buoy watch circle.

The proposed metocean buoy will be lit by a Carmanah M701 self-contained amber LED obstruction lamp. The lamp is programmed to displace a flash every 20 seconds according to IALA regulations for AToN. The navigation/obstruction light is powered autonomously including a solar panel and battery with an average five-year lifespan.

The metocean buoy is expected to carry sensors to accurately measure and collect wind profiles (speed and direction) at different heights within a vertical measurement cone projected above the metocean buoy. Within the cone, wind data can be obtained at varying heights, including heights of the blade spans of the planned offshore wind turbines. The metocean buoy will also likely be equipped with oceanographic sensors that can obtain ocean wave height and direction data, and current profiles from the sea surface to the seabed.

The metocean buoy is expected to have on-board data storage, a real-time operating system, and flexible data acquisition software. All measured data are typically processed on-board and accessed through a two-way communication link for data transfer. This information will be utilized to assess site-specific wind resources and assist in developing engineering design criteria for the development activities in the Lease Area.

The metocean buoy will also include an avian acoustic recorder (operating at 20 Hz – 40 kHz) and bat ultrasonic recorder (operating at 256 kHz). The avian acoustic recorder is always on; the bat ultrasonic recorder operates from one hour before sunset to one hour before sunrise. Both recorders have their own housings on the top of the buoy, where the wiring and data recorders are housed inside the buoy while only the microphone is exposed to the environment. Data are expected to be retrieved from the metocean buoy every three months, weather permitting. Once the data are retrieved, the Proponent or the Proponent's contractor will upload the data to Motus, typically within one-two months of retrieval. Data will be acquired during the entire period of buoy deployment as described in Section 2.2.

The TRBM is expected to contain multiple sensors to collect wave and current data. It is expected that the TRBM will contain a Nortek AWAC-600 to provide near full water column profiles of current speed and direction, at multiple configurable depths. Surface wave height, direction, period, and other characteristics will also be obtained.

During deployment, the Proponent will share near real-time metocean data on a website; the real-time data will provide a snapshot of current metocean conditions and will not be searchable or downloadable. After the end of the buoy deployment period, the Proponent will publicly share non commercially-sensitive metocean data from the entire period of deployment; these data will be searchable and downloadable.

6.2 Maintenance Activities

The Proponent will prepare a Self-Inspection Plan in accordance with 30 CFR Parts 585.615 and 585.824. These will include comprehensive on-site inspections of all metocean buoy components approximately every six months (subject to vessel availability and weather conditions). The inspections will also comply with manufacturer's guidance to test and maintain the specific metocean buoy system.

Metocean buoy maintenance activities typically include pre-deployment inspections and testing of components, and once deployed, include routine battery changes, replacement of worn or damaged parts, and checks of mechanical, electrical, and sensor systems. The mooring chain will be inspected for abrasion and corrosion consistent with routine USCG inspections for similar mooring chains. In addition to these planned maintenance activities every six months, the metocean buoy will also be visually inspected every three months as part of the effort to retrieve the avian and bat acoustic recorder data. Finally, metocean buoy performance will also be monitored remotely on a daily basis, based upon satellite-transmitted data, to continually assess the power systems and sensors on the metocean buoy.

Scheduled on-site maintenance activities of the metocean buoy will use a vessel that is comparable to the vessel used for installation, with sufficient lift capacity as needed. Any device that suffers from malfunction or collision will be replaced with a similar device. Maintenance activities could include recovery and/or replacement at the same location of a metocean buoy with the same or similar type if circumstances require such action (e.g., metocean buoy damage or loss). For recovery operations, either during normal maintenance or in an emergency, after confirming the location and visually sighting the metocean buoy, the vessel will be positioned adjacent to the mooring for a visual inspection by the crew and safety toolbox talk, including details of the recovery procedure.

Once the crew has been briefed on the most suitable method for retrieval with respect to site conditions, the captain will commence the operation by repositioning the vessel appropriately. An A-frame and winch will be attached to the recovery line of the metocean buoy. This line will be pulled up to reach the main mooring line. The full mooring will be pulled from the water onto the deck of the vessel. The mooring weight will be lifted off the seafloor in one motion

and raised to a height such that it does not drag and cause bottom disturbance. The metocean buoy will be lifted out of the water onto the deck of the vessel. Once fully retrieved, the mooring system and metocean buoy will be secured to the vessel for safe travel back into the harbor.

TRBM maintenance activities will typically occur at six-month intervals (subject to vessel availability and weather conditions). The TRBM platform is recovered by triggering an acoustic release to allow a recovery buoy and line to float from the TRBM to the surface. Once recovered, a fully configured and tested replacement system is installed. Data will be downloaded from the recovered system and the TRBM will be refurbished for redeployment during the next maintenance event.

Unscheduled maintenance, if required, will be conducted as soon as it is safe and practicable to access the metocean buoy and/or TRBM.

6.3 Reporting

The Proponent will report operations and maintenance information about the metocean buoy and TRBM to BOEM as required in 30 CFR §585.615 and as specified in the SAP approval, when issued by BOEM. These include:

1. preparing and submitting an annual report to BOEM on November 1 of each operational year summarizing the site assessment activities and results; and

4. annual submission of a certification of compliance with certain terms and conditions of the SAP approval, including any mitigation measures and monitoring measures and their effectiveness.

The Proponent will continue to provide notifications to other federal agencies as required (e.g., to USCG) during operation and maintenance of the metocean buoy.

7.0 DECOMMISSIONING

7.1 Decommissioning Activities

Decommissioning is expected to be the reverse of deployment and installation activities described in Section 5.1. As stipulated, all facilities will be removed to a depth of 15 feet below the mudline, unless otherwise authorized by BOEM.

Duration of deployment is expected to last two years, but could last up to five years, coinciding with the site assessment term of the Lease. Before decommissioning occurs, the Proponent will submit a decommissioning application for approval by BOEM. The application will contain the information required by 30 CFR §585.906, including a schedule for removal, a description of the removal methods and procedures, the types of equipment, vessels and moorings that will be used, and plans for transportation and disposal or salvage. Planned measures to protect

archaeological and sensitive biological features during removal (if any) and to prevent unauthorized discharge of pollutants, trash, and debris during removal will also be included in the application.

Following approval of the application, the Proponent will submit a decommissioning notice at least 60 days prior to commencing decommission activities, in accordance with 30 CFR §585.908.

Device recovery will be undertaken by vessels similar to those used during commissioning. The recovery of the metocean buoy will typically proceed by decoupling the metocean buoy from the mooring and conducting a standard marine mooring recovery process.

The metocean buoy and all related moorings will be removed, in accordance with 30 CFR §585.902. The seafloor will be cleared of all obstructions. The metocean buoy will then be moved to shore and decommissioned.

Recovery of the TRBM will consist of triggering the acoustic release to allow a recovery buoy and line to float from the TRBM to the surface. The TRBM will then be moved to shore.

If any archaeological resources are discovered during decommissioning activities, bottom-disturbing activities will be halted immediately within 1,000 feet (304.8 m) of the discovery and reported to BOEM for guidance within 72 hours, in accordance with 30 CFR §585.902e.

The Proponent will also conduct a post-decommissioning high-resolution geophysical (HRG) survey of the buoy deployment area. The Proponent plans on using multibeam echosounder (MBES) technology to clear the area after metocean buoy decommissioning. This technology does not operate below 180 kiloHertz (kHz).

7.2 Reporting

The Proponent will report decommissioning information about the metocean buoy and TRBM to BOEM as required in 30 CFR §585.912 and as specified in the SAP approval upon issuance by BOEM. Within 60 days of removal of the metocean buoy, TRBM, and related equipment, the Proponent will submit a report to BOEM summarizing the removal activities, describing mitigation measures taken, and including a statement by an authorized representative that explosives used, if applicable, were consistent with those described in the approved decommissioning application.

The Proponent will also provide notifications to other Federal agencies as required (e.g., to USCG) prior to decommissioning of the metocean buoy and TRBM.

8.0 FIELD INVESTIGATIONS AND STUDIES IN THE SAP STUDY AREAS

This section and the Appendices referenced herein describe the site-specific SAP field surveys conducted in two 300 m by 300 m (984 ft by 984 ft) deployment study areas (SAP-1 and SAP-2) that are expected to be occupied by the metocean buoy on Lease Area OCS-A 0544, as shown on Figures 2.1-1 and 2.1-2. Each 22-acre SAP study area constitutes the maximum Affected Environment of the metocean buoy and TRBM, in that the buoy could be located anywhere within its study area. Resources and hazards identified by the surveys in the study areas are described in Section 9.0. Impacts are assessed and measures to avoid, minimize, or mitigate are also described in Section 9.0.

The following site-specific field surveys were conducted to assess the Affected Environment of the metocean buoy and TRBM:

- Geophysical survey of each SAP study area, to identify and assess seafloor conditions and shallow hazards;
- Shallow geotechnical survey to collect sediment samples and measurements from each study area for information on seabed materials and potential sediment dispersion;
- Archaeological resource survey utilizing the geophysical datasets, to assess the presence or absence of potentially significant shipwrecks and other archaeological resources; and
- Biological survey to identify the benthic communities and organisms in sediment samples and along underwater video transects.

In addition, oceanographic and meteorological information has been compiled from existing scientific literature and online data sources referenced herein. Once the metocean buoy and TRBM are deployed, site specific metocean data collection will commence.

Geophysical and shallow geotechnical field investigations in the Lease Area OCS-A 0544 SAP study areas took place on select days between 05 August and 30 December 2022 as part of the coordinated 2022 field campaign that addressed scope in Lease Area OCS-A 0544. Details of these investigations in the SAP study areas are included in the survey operations reports in Appendix B.

Two SAP study areas were investigated in Lease Area OCS-A 0544, centered on the proposed metocean buoy and TRBM deployment locations. A full geophysical suite of instruments was employed along a series of 11 primary lines spaced 30 m (98.4 ft) apart in a N-S orientation. Systems included a multibeam echosounder, side-scan sonar, gradiometer (dual magnetometers), sub-bottom profiler, and single channel seismic system.

For ground truthing of the acoustic data and assisting with surficial sediment and biological and benthic habitat characterization, as well as shallow subsurface sediment identification, one cone penetration test, one vibracore, one sediment grab sample, and one underwater video transect were acquired near the center of each SAP study area. Figure 8.0-1 through Figure 8.0-4 show the tracklines and sample locations within the SAP study areas. Results and interpretations of the data are presented in the following sub-sections as well as Appendices B and D.

8.1 Geophysical and Shallow Geotechnical Surveys and Geologic Characteristics

The OCS-A 0544 lease SAP study areas are located on the OCS south of Long Island, New York within the NYB WEA in a region dominated by reworked sediments under transport without significant amounts of deposition or erosion apparent. The seabed is dominated by a combination of recent marine sediments (Holocene age) and reworked glacial deposits (Pleistocene) of varying thicknesses. SAP-1 gradually deepens in a SW to NE orientation (diagonally across the SAP) with depths ranging from ~41.7 m (136.8 ft) to ~43.0 m (141.1 ft) MLLW. SAP-2 exhibits a similar trend but deepens in a NE to SW orientation with depths ranging from ~42.7 m (140 ft) to ~44.2 m (145.0 ft) MLLW. Limited low relief bedforms (sand ripples) suggest minimal seabed mobility in the area. Grain size is fairly homogenous throughout the Lease Area and is composed of mostly fine and medium grained sands; as supported by sediment grabs and side-scan sonar.

The combination of all remote sensing (geophysical and video) and sampling (benthic grab and vibracore) datasets have helped to define the local geologic characteristics of the SAP study areas in the areas potentially impacted by the metocean buoy and TRBM installation. While a 300 m by 300 m (984 ft by 984 ft) square area was surveyed, the actual footprint of the buoy mooring weight, associated chain sweep, and TRBM are much smaller in comparison.

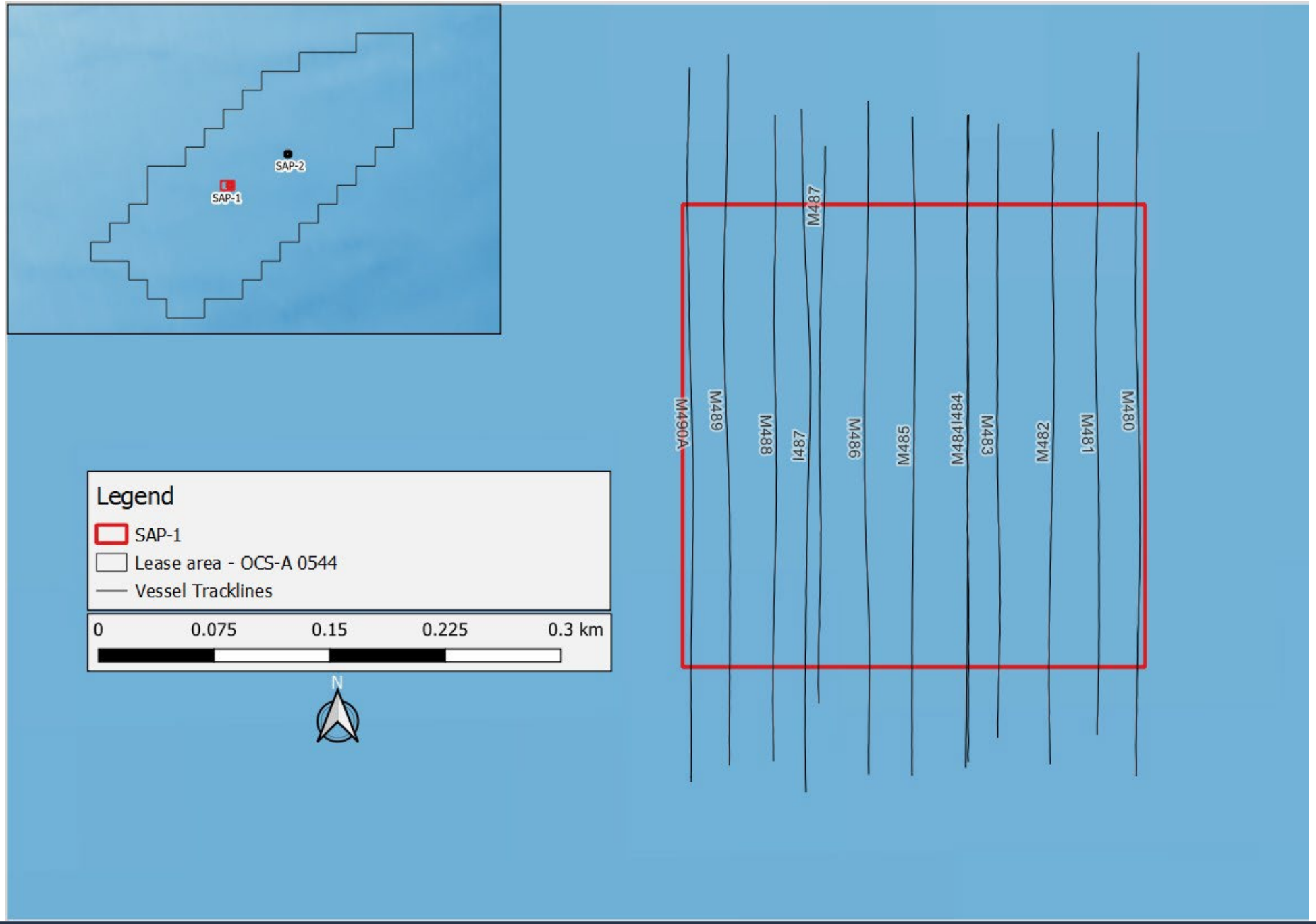

Figure 8.0-1
Location of SAP-1 Field Surveys

VINEYARD MID-ATLANTIC
VINEYARD OFFSHORE

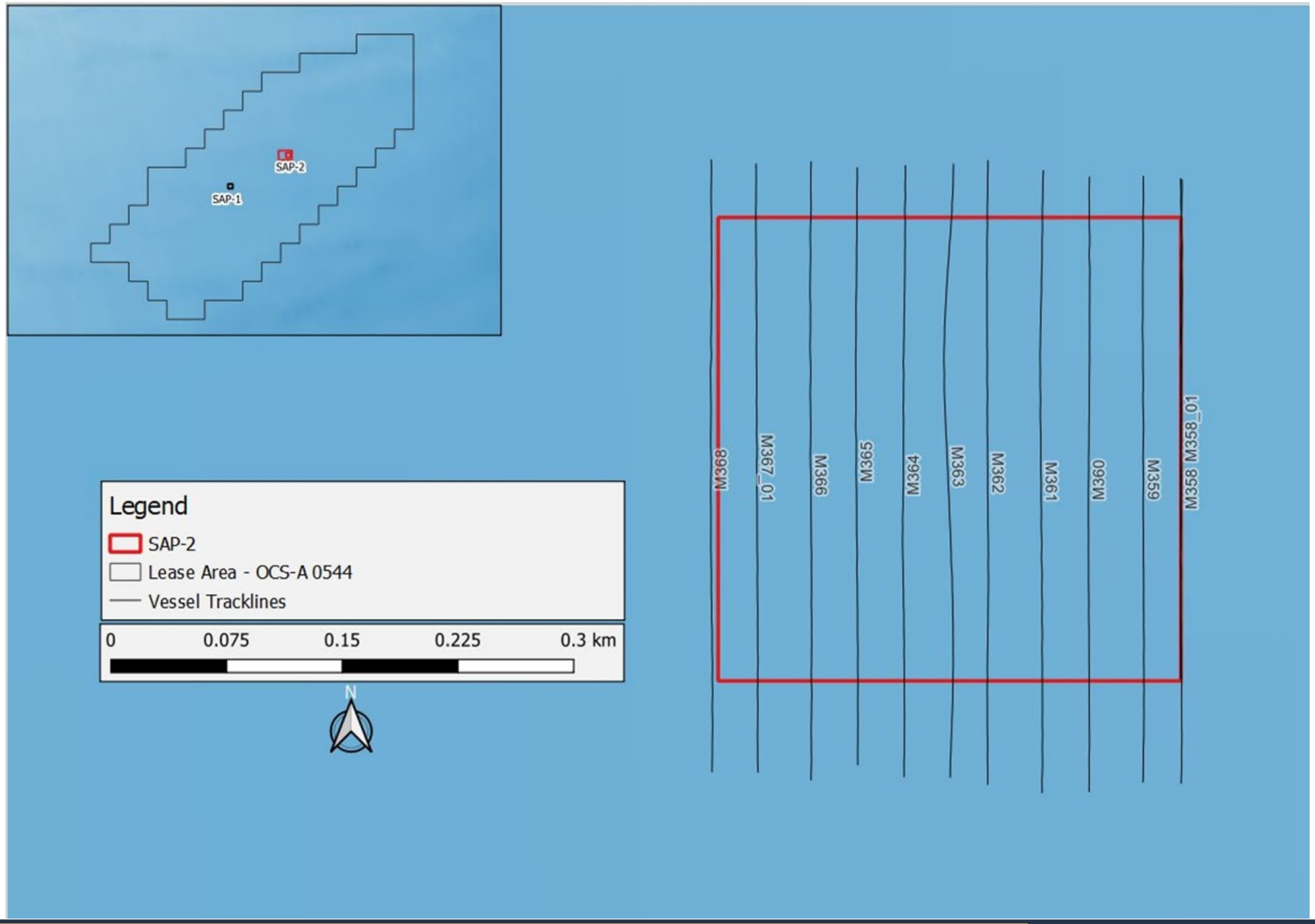

Figure 8.0-2
Location of SAP-2 Field Surveys

VINEYARD MID-ATLANTIC
VINEYARD OFFSHORE

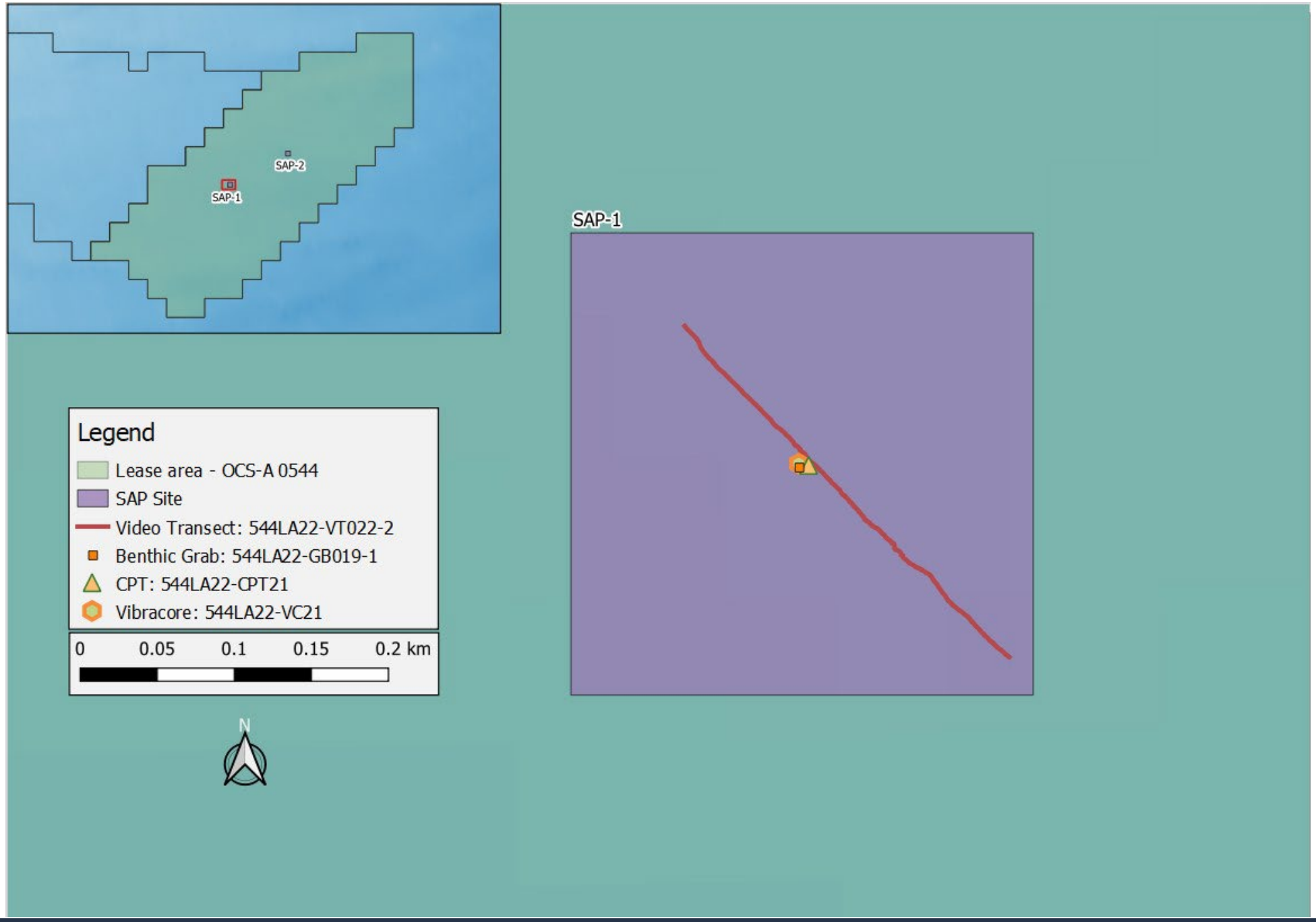

Figure 8.0-3
Map of SAP-1 Sampling Locations

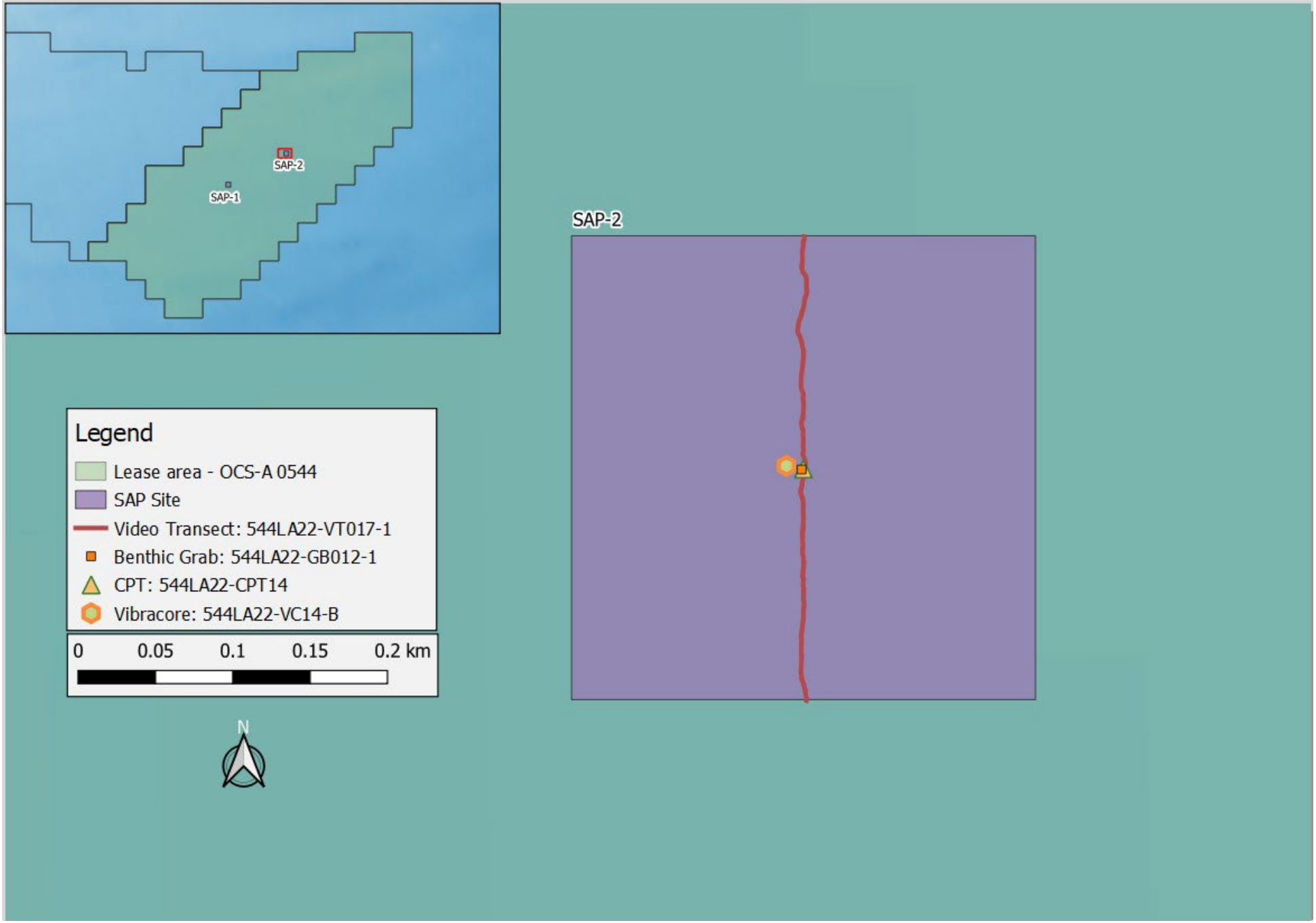

Figure 8.0-4
Map of SAP-2 Sampling Locations

Table 8.1-1 SAP Study Areas Geologic Characteristics

	SAP-1	SAP-2
Water Depth (MLLW)	42.0 m (138.8 ft)	43.0 m (141.1 ft)
Surface geology	Fine to medium grained sand with ripples containing low to moderate amounts of shell fragments within the troughs	Fine sand with ripples containing low to moderate amounts of shell fragments within the troughs
Subsurface geology	Medium to fine grained sand with shell fragments. Pockets of silty sand and some organics (to 2.64 m (8.66 ft) below the seabed (bsb); VC14-B)	Fine to medium grained sand with shell fragments in the upper 2.00 m. Medium and coarse sand with pockets of silty sand in the lower segments (to 5.61 m bsb; VC21)
Unique features	None	None

Fine grained sediments exist on the seafloor, mainly fine and medium grained sand (based on the Unified Soils Classification System [USCS]), with minor morphological and textural variation. A slight increase in overall particle size is apparent in the (benthic grab samples) grain size results for SAP-1, with a median grain size of 0.474 mm (0.019 in), in comparison to the median grain size of 0.383 mm (0.015 in) observed in SAP-2. Both SAP-1 and SAP-2 exhibit low relief bedforms (< 0.2 m [0.66 ft]), characterized as ripples. No other notable features were observed in either SAP study areas (Figures 8.1-1 to 8.1-4).

Uniform conditions persist in the subsurface as the geophysical and vibracore results indicate mostly medium to fine grain sand present in the upper three m (ten ft) bsb. Both vibracore samples also exhibit sections containing shell fragments, silty sand and some organics (in VC14-B). No additional sediment layers were recovered in the core samples. Geotechnical results suggest the sediments are relatively competent and not overly soft (loose, high water content).

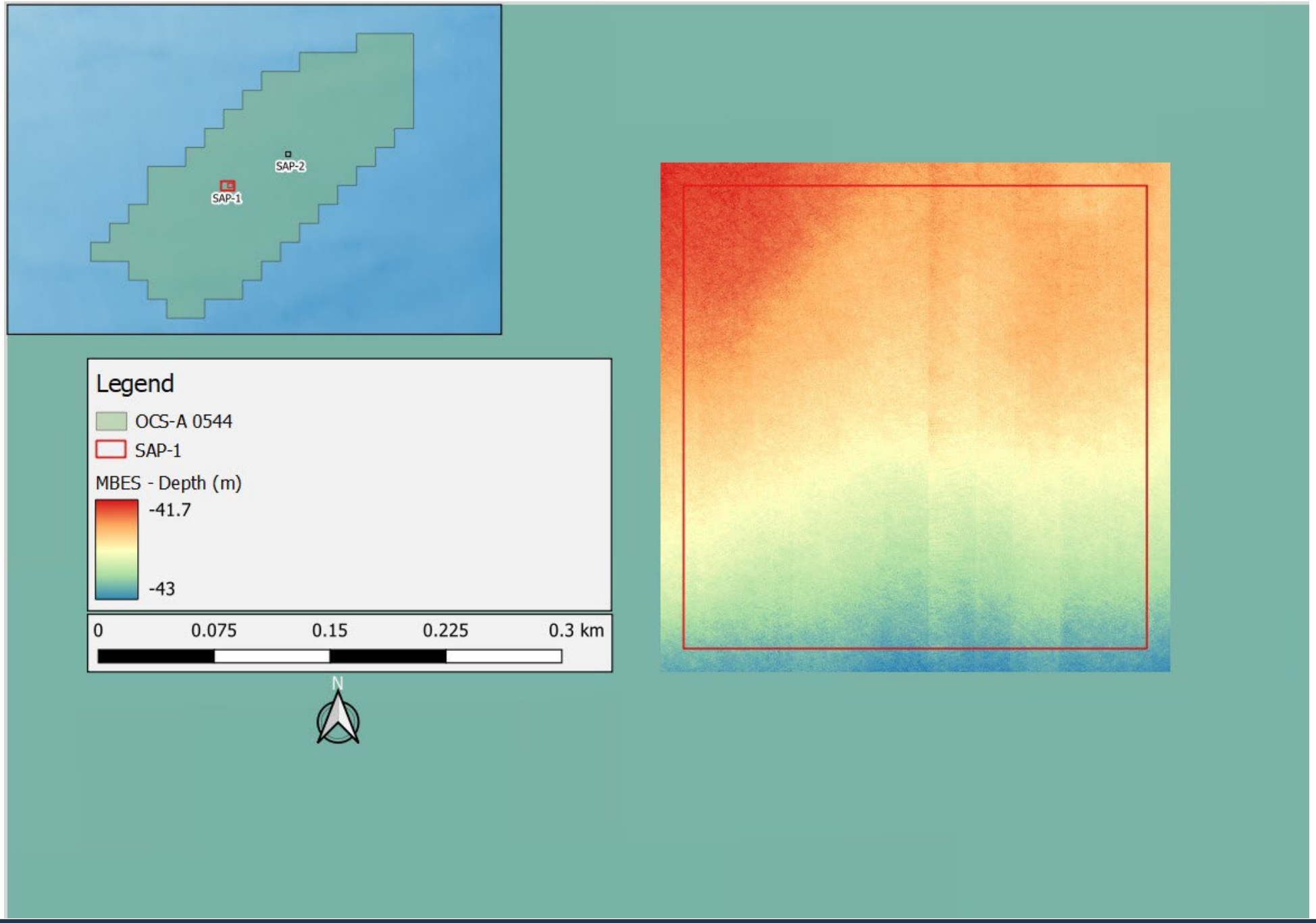

Figure 8.1-1
SAP-1 Seafloor Features (Multibeam)

VINEYARD MID-ATLANTIC
VINEYARD OFFSHORE

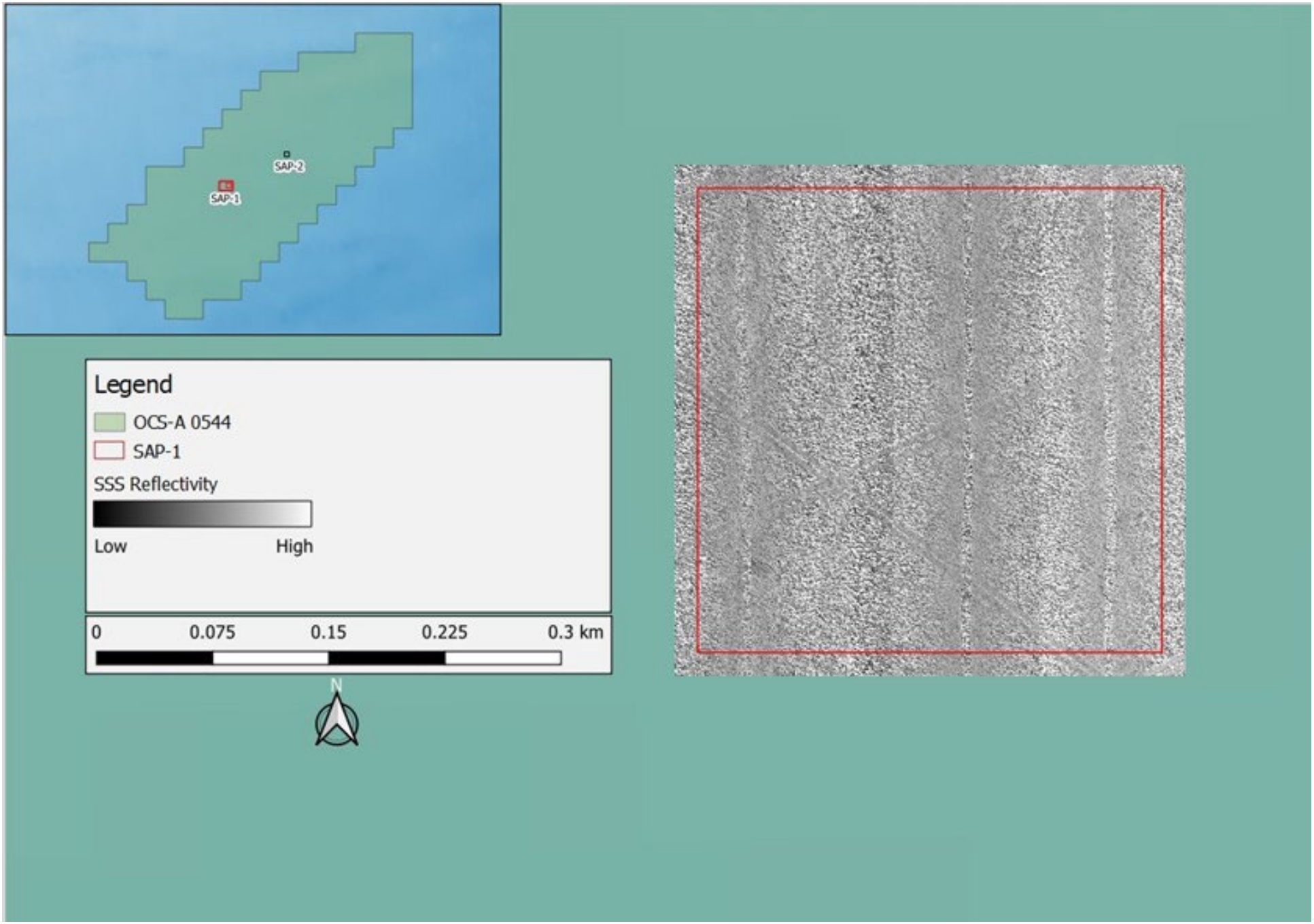

Figure 8.1-2
SAP-1 Seafloor Features (Side-scan Sonar)

VINEYARD MID-ATLANTIC
VINEYARD OFFSHORE

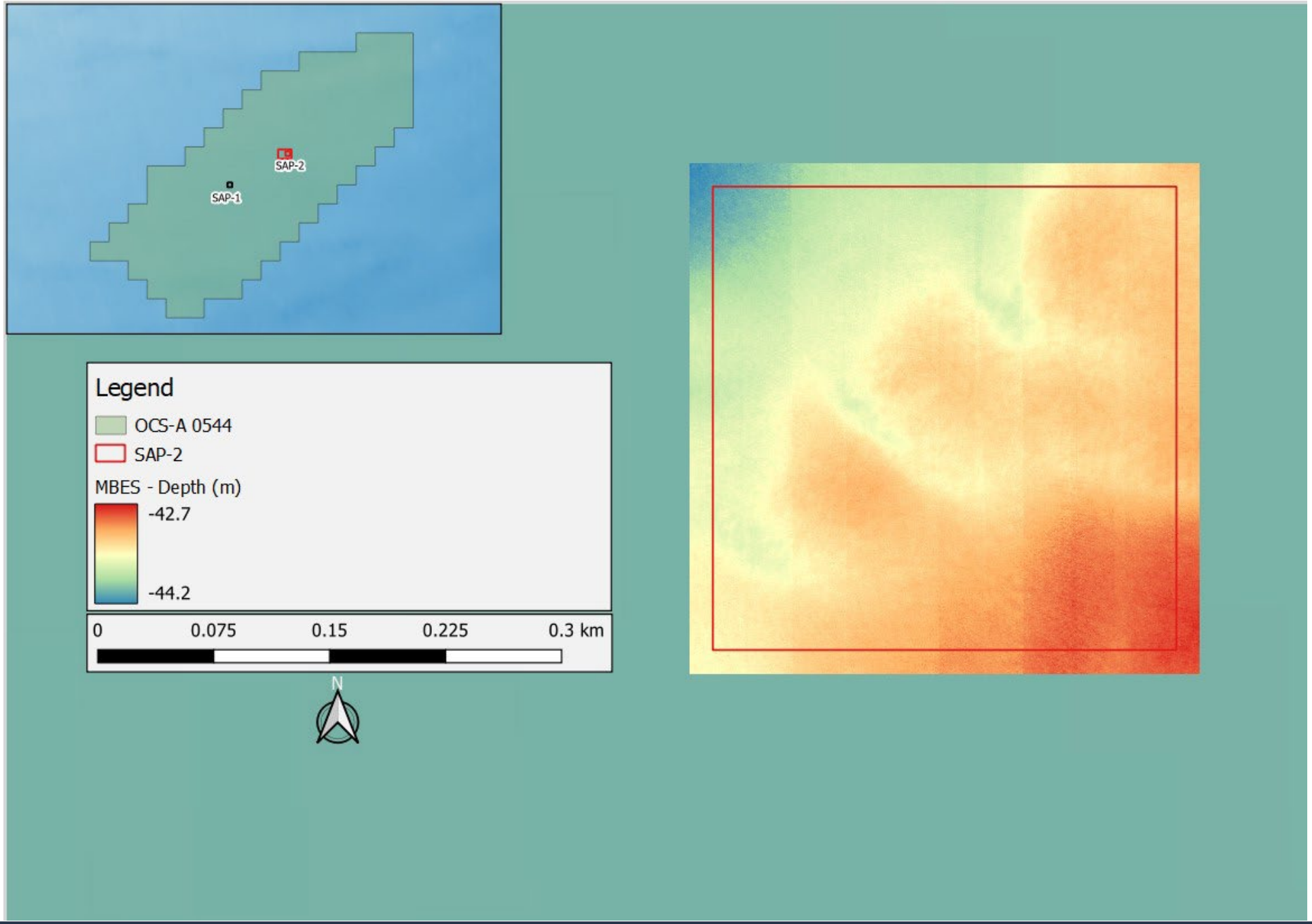

Figure 8.1-3
SAP-2 Seafloor Features (Multibeam)

VINEYARD MID-ATLANTIC
VINEYARD OFFSHORE

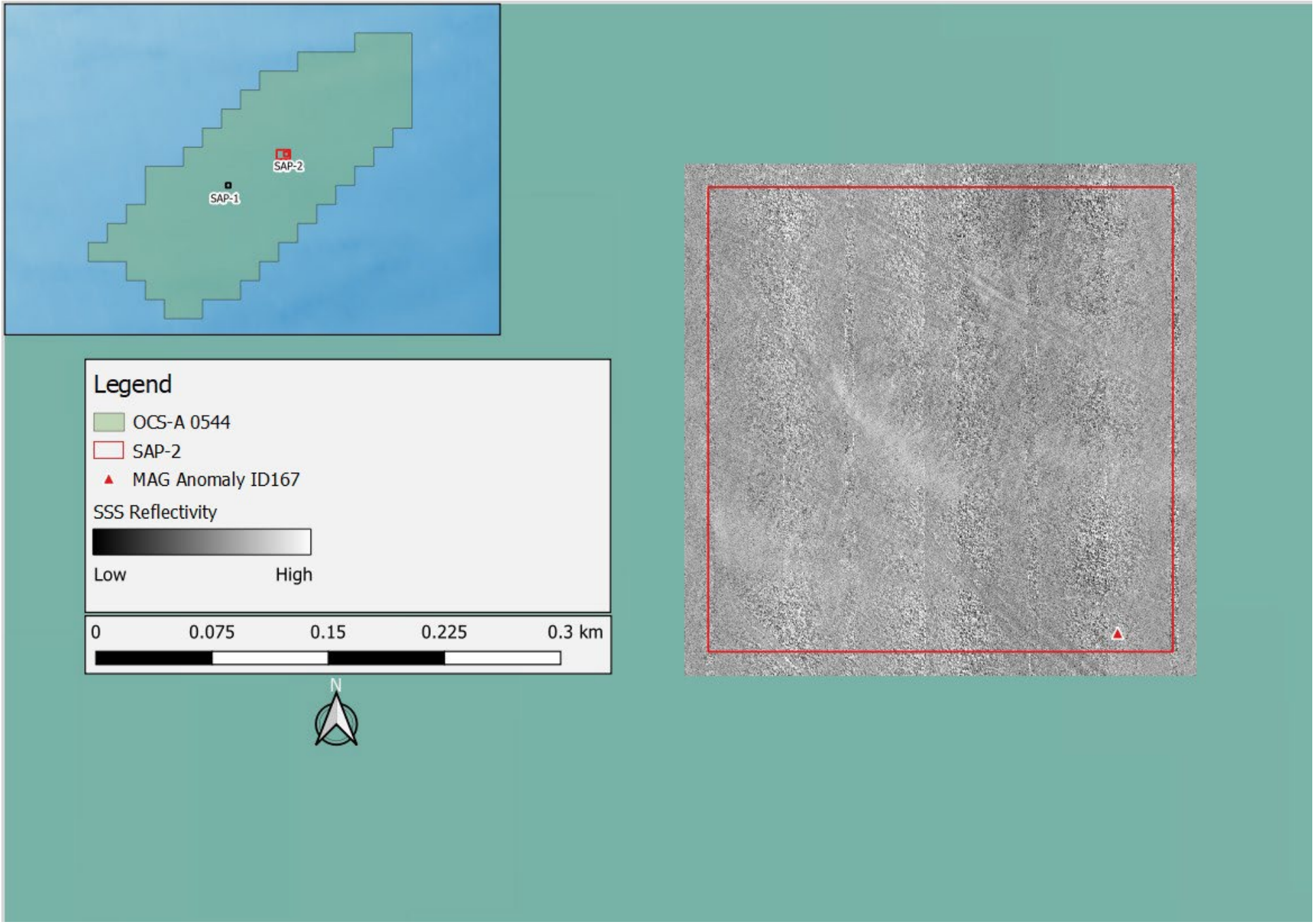

Figure 8.1-4
SAP-2 Seafloor Features (Side-scan Sonar)

VINEYARD MID-ATLANTIC
VINEYARD OFFSHORE

8.2 Shallow Hazards

Review of the geophysical data was performed to specifically assess the SAP study areas for the presence of shallow hazards exhibiting surficial or subsurface expression on the records. The surface sonar imagery (multibeam echosounder and side scan sonar), magnetic intensity measurements, and subsurface data (sub-bottom profiling and single channel seismic reflection) were interpreted and then evaluated for the following hazards, as detailed in 30 CFR § 585.610(b):

Table 8.2-1 Shallow Hazards in the SAP Study Areas

30 CFR § 610(b)(2)	
Shallow faults	Not evident in the data
Gas seeps or shallow gas	Not evident in the data
Slump blocks or slump sediments	Not evident in the data
Hydrates	Not evident in the data; not common in these shallow water depths
Ice scour of seabed sediments	Not evident in the data
30 CFR § 610(b)(4)	
Seismic activity	Uncommon to this offshore region based on publicly available information (USGS earthquake database) [1]
Fault zones	Not evident in the data
Possibility and effects of seabed subsidence	Low probability and not apparent if occurring at all; insignificant to the proposed activity at low rates
Extent and geometry of faulting attenuation	Not evident in the data

Notes:

1. **Earthquakes | U.S. Geological Survey (usgs.gov)**

Other potential hazards (listed below) that could pose impacts to the project were also considered and evaluated. None were interpreted or observed to a significant level in the geophysical datasets.

- Organics/gaseous sediments
- Boulders, coarse deposits
- Bedforms, slope instability
- Mobile sediments, scour
- Buried channels
- Sensitive benthic habitats (see Section 8.5)
- Man-made debris, obstructions, potential ordnance

- Cultural resources (shipwrecks, paleofeatures; see Section 8.4)

The only feature identified on or below the seafloor inside of the 300 m by 300 m (984 ft by 984 ft) SAP study areas was a single magnetic anomaly within SAP-2. No acoustic targets were observed in either SAP study areas with SAP-1 also lacking any magnetic anomalies.

Within SAP-2, one magnetic anomaly was observed (ID 167; dipole) with an amplitude of 5.13nT (Figure 8.1-4). This anomaly was not accompanied by any evident acoustic target within the sonar data. The single target was also assessed by the QMA at R. Christopher Goodwin & Associates, Inc (RCG&A) and determined to be debris not found to have cultural significance nor warrant avoidance. Additional target details are reported in Appendix C (RCG&A Report).

No other potential shallow hazards were observed, and the single magnetic anomaly was small in amplitude and well away from the center of the SAP study area where the buoy weight would ideally be placed. Therefore, it may be concluded that no notable hazards exist in the deployment areas. Additionally, the absence of bedforms of any significant relief indicate relatively low bottom currents, and thus limited sediment mobility within the SAP study areas.

8.3 Meteorological and Oceanographic Conditions

Two main sources of meteorological and oceanographic data (metocean) near Lease Area OCS-A 0544 were used to report local wind and wave patterns from 2012 to 2022. NOAA Buoy 44025 (Long Island) is moored 30 NM (55.6 km) South of Islip, Long Island in a depth of 36.3 m (119.1 ft). NOAA Buoy 44066 is positioned 75 NM (139 km) East of Long Beach, New Jersey in a depth of 77 m (252.6 ft). These metocean stations have been referenced to provide the general background of wind and wave conditions in the region and expected at the Lease Area as a proxy for meteorological and oceanographic data analyzed prior to SAP study area occupancy (Figure 8.3.1). NOAA Buoy 44025 is located 0.25 NM (0.46 km) northwest of the Lease Area. NOAA Buoy 44066 is located 40 NM (74.1 km) southeast of the Lease Area. Quality Controlled data provided by NOAA were sourced from the historical logs for each buoy utilizing data from 2012 through 2022; data sets were assessed for consistency, missing data, and erroneous values prior to analysis of wind and wave data for this report.

In general for the continental shelf off New York and New Jersey, wind speeds and wave heights at the buoys were higher during winter and tapered off into summer (Figures 8.3-2, 8.3-3, 8.3-4 and 8.3-5). The prevailing wind direction was approximately south-southeast. Waves generally traveled to the east, southeast, and south, with a prevailing wave direction of approximately south. Nearshore currents within the Middle Atlantic Bight are directly influenced by seasonal wind stress with winds directing currents westward along Long Island during winter and fall and offshore during spring and summer (Fredj 2016). Mean depth-averaged currents along the continental shelf in the Middle Atlantic Bight is toward the equator. Current speeds increase with water depth starting at 3 cm s-1 (0.06 knots) at the 15 m isobath and reaching ten cm s-1 (0.19 knots) at the 100 m (328 ft) isobath (Lentz 2008).

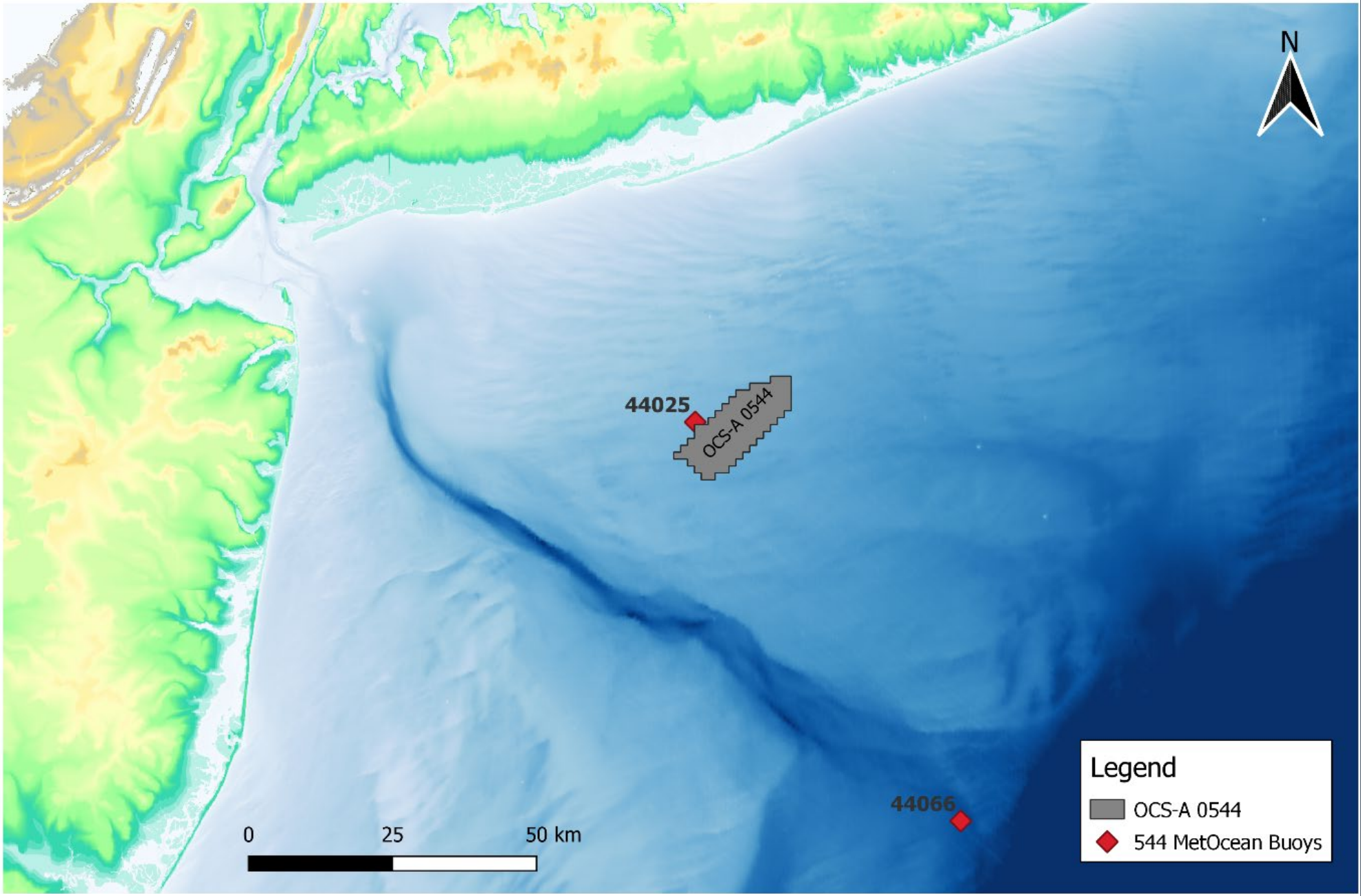

Figure 8.3-1
NOAA Buoy Locations Southeast of Nantucket Shoals

VINEYARD MID-ATLANTIC
VINEYARD OFFSHORE

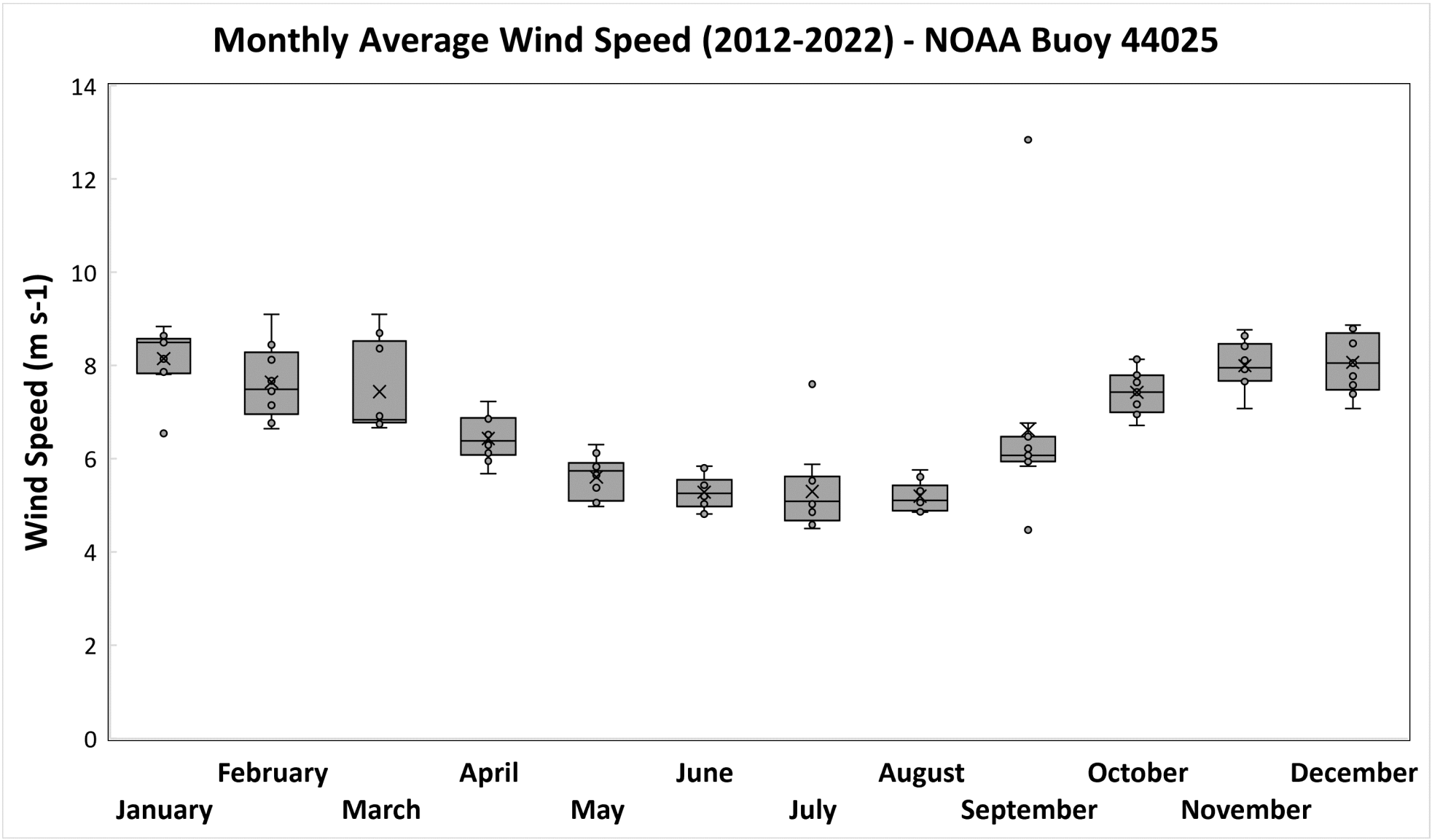

Figure 8.3-2
Wind Speeds at NOAA Buoy 44025, 2012-2022

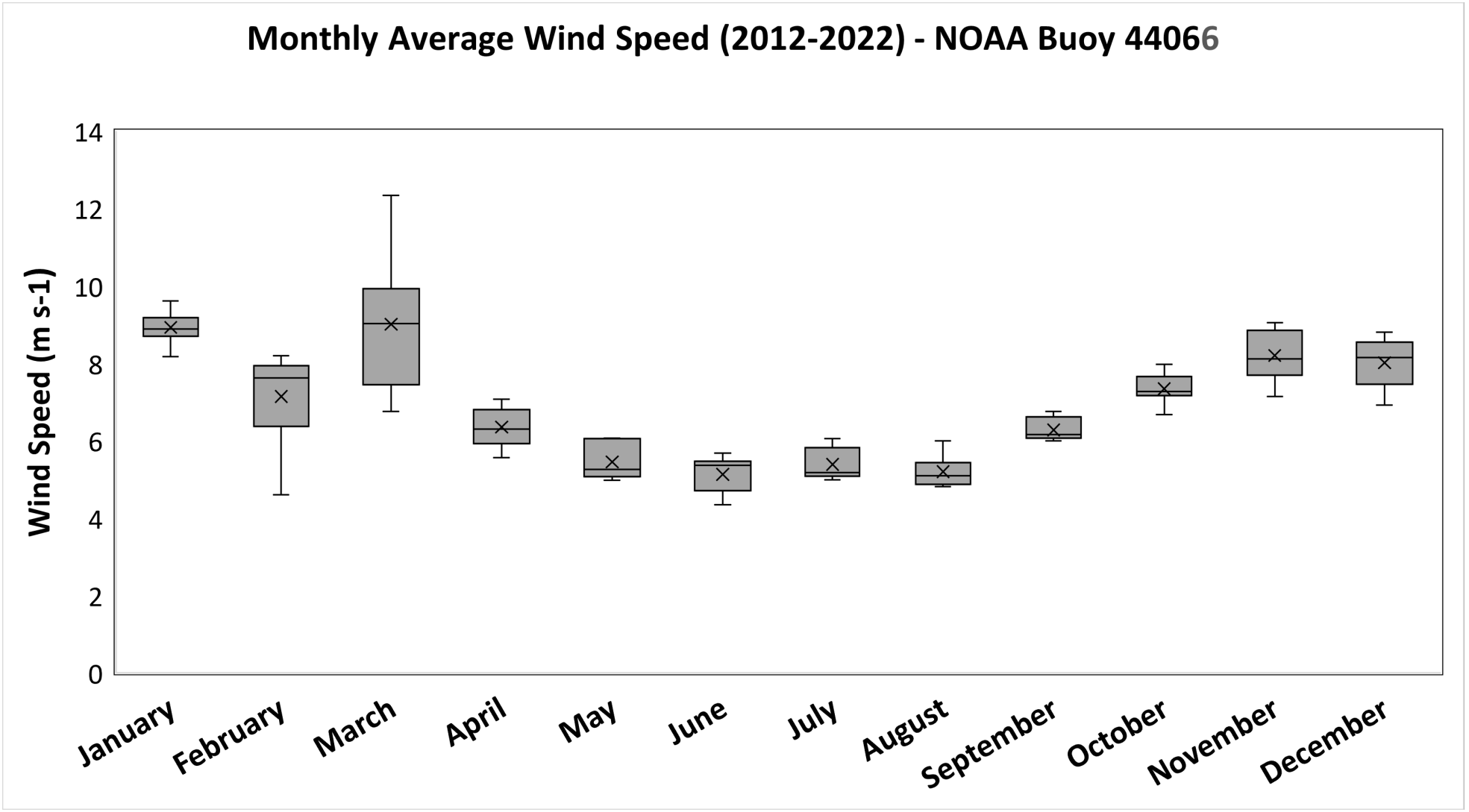

Figure 8.3-3
Wind Speeds at NOAA Buoy 44066, 2012-2022

VINEYARD MID-ATLANTIC
VINEYARD OFFSHORE

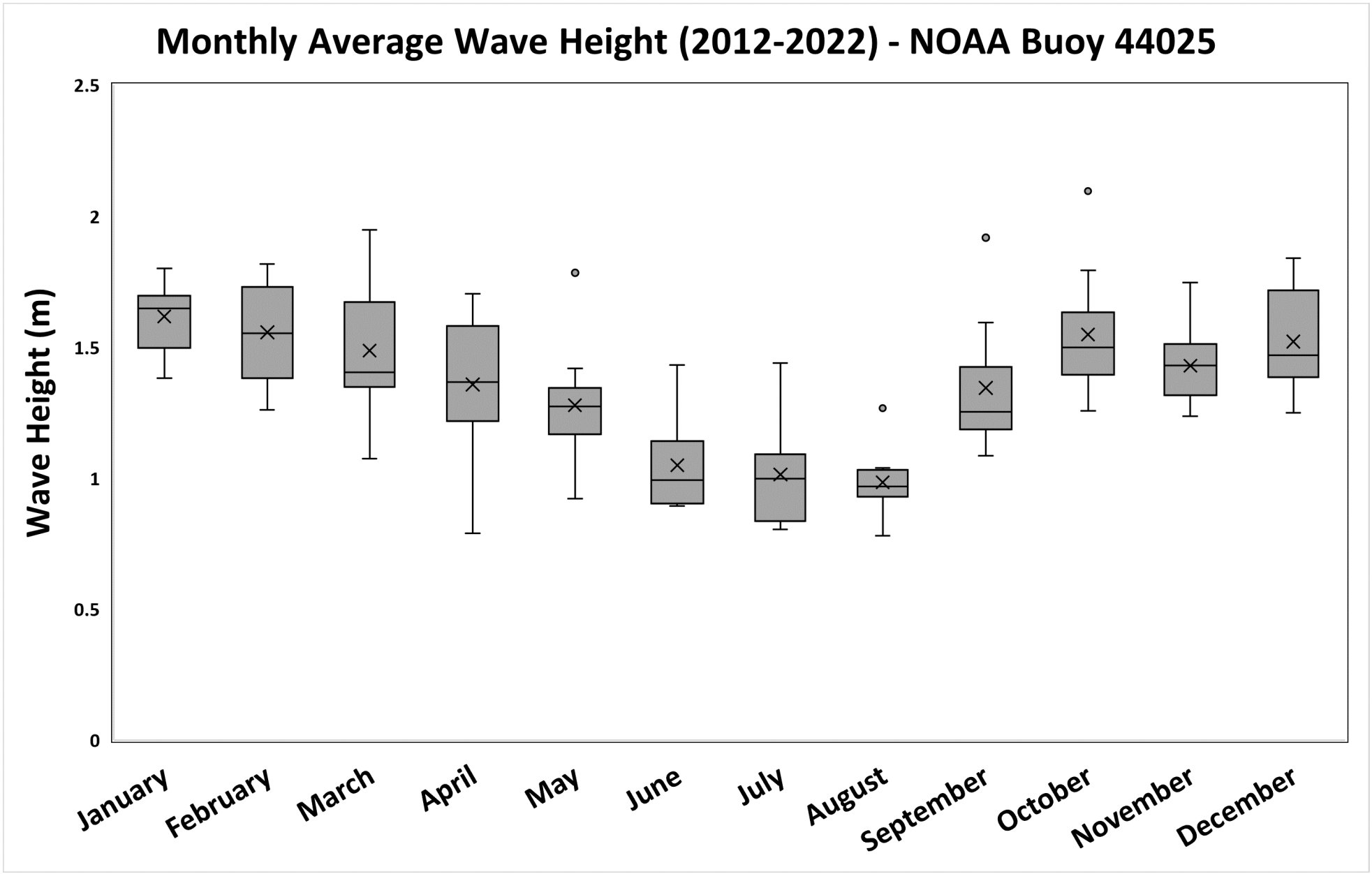

Figure 8.3-4
Wave Heights at NOAA Buoy 44025, 2012-2022

VINEYARD MID-ATLANTIC
VINEYARD OFFSHORE

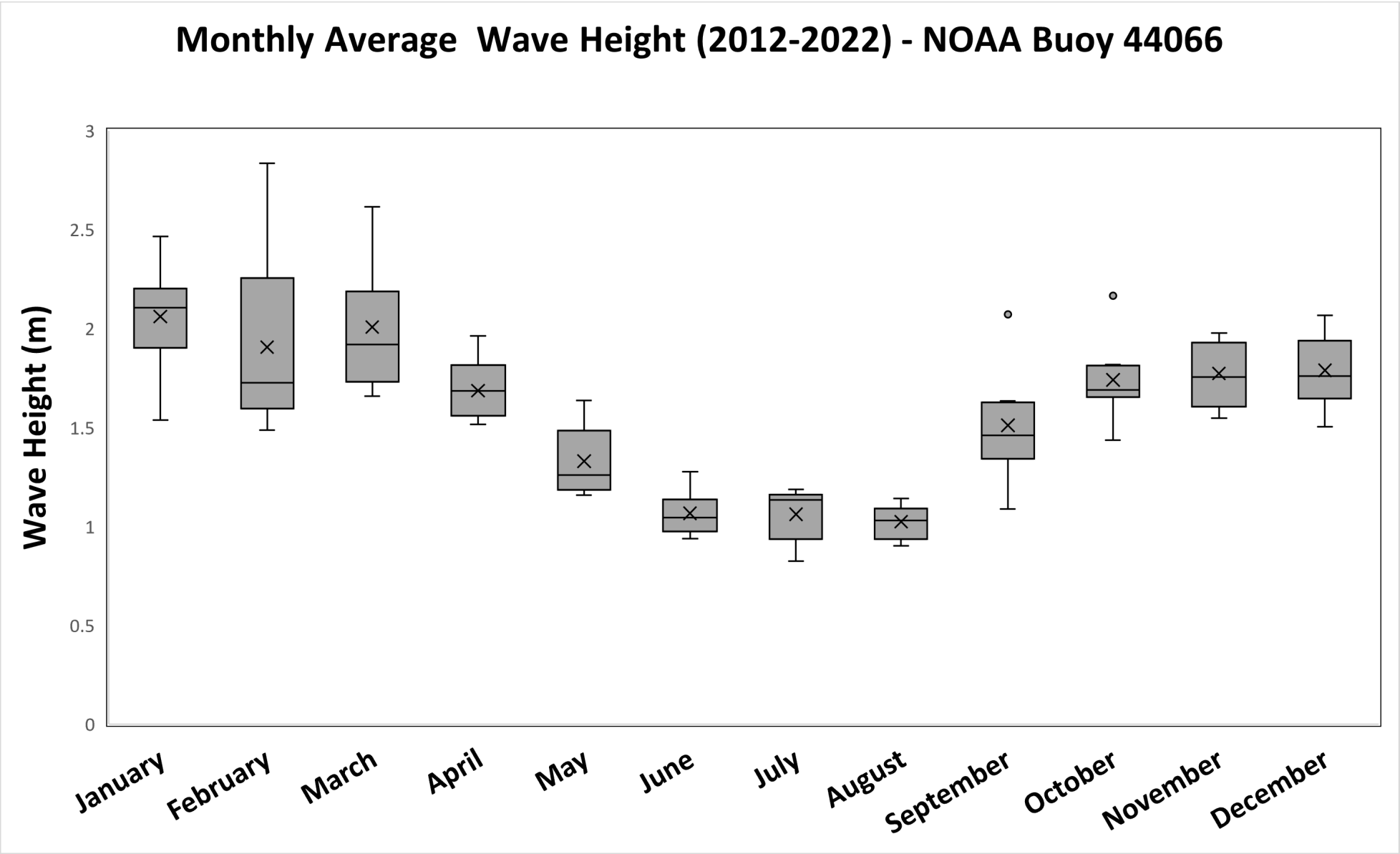

Figure 8.3-5
Wave Heights at NOAA Buoy 44066, 2012-2022

VINEYARD MID-ATLANTIC
VINEYARD OFFSHORE

Extreme wind and wave conditions during major storms significantly impact water conditions and sedimentation in the Lease Area OCS-A 0544 region (Twichell et al. 1981). The storms near the Lease Area typically travel along the east coast toward the north-northeast, as seen by the tracks of major hurricanes between 2012 and 2022 in Figure 8.3-6. Buoys 44025 and 44066 demonstrate that significant wave heights can increase on the order of four times their typical range during the extreme weather events such as Nor'easters (Table 8.3-1) and Hurricanes (Table 8.3-2). Two storms in particular tracked close to the Lease Area with records indicating waves up to 3.3 m (11 ft) in height impacted that area of the NYB.

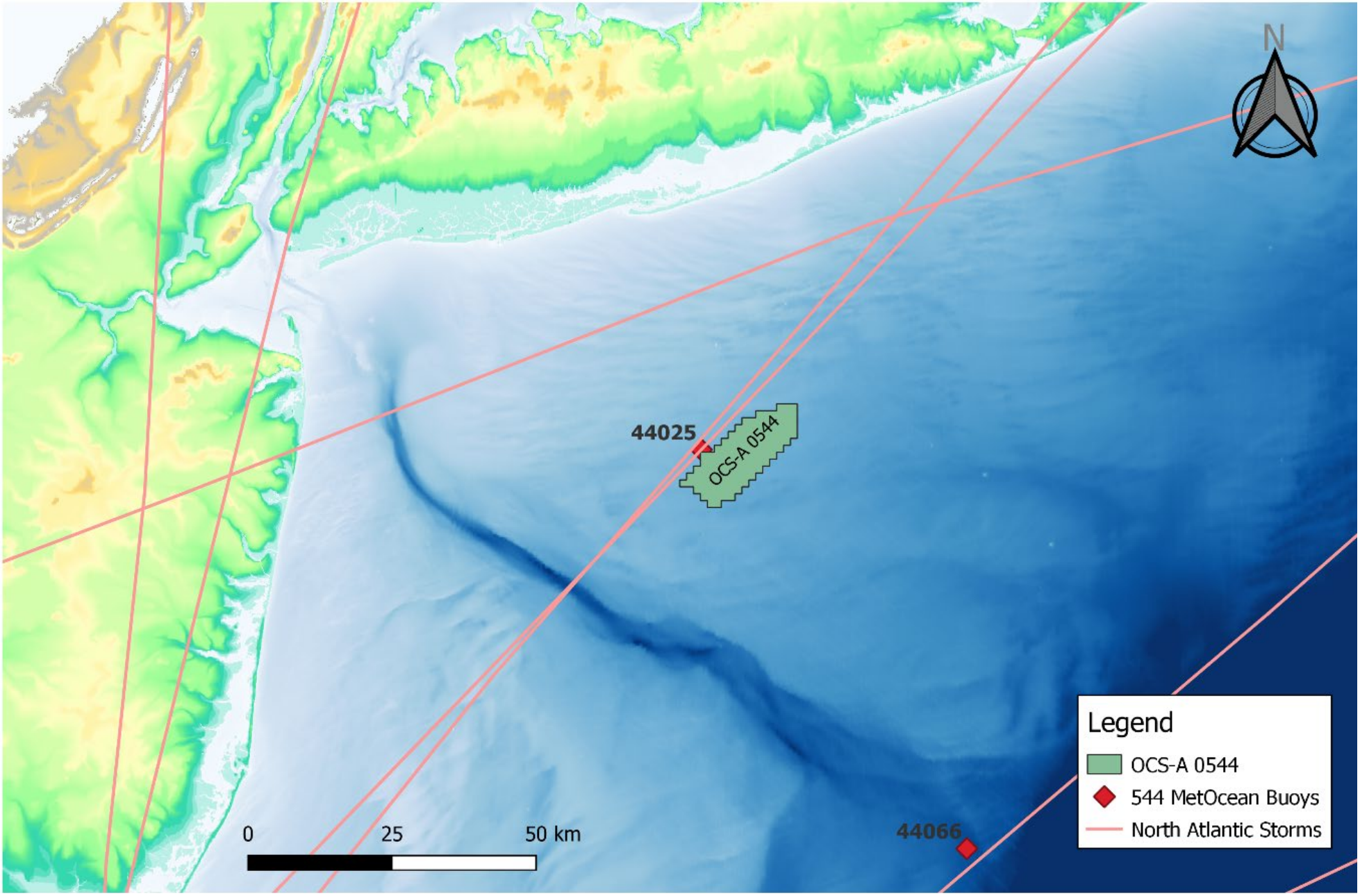

Figure 8.3-6
Major Hurricanes 2012-2022 Near the NYB WEA

VINEYARD MID-ATLANTIC
VINEYARD OFFSHORE

Table 8.3-1 Nor'easter Storms with Highest Significant Wave Heights since 2012

Peak Significant Wave Heights at NOAA Station 44025 and 44066 for Nor'easters			
Storm	**Date**	**Wave Height (44025)**	**Wave Height (44066)**
November 2012 Nor'easter	November 7–10, 2012	6.10 m (20.0 ft)	NA
Late December 2012 North American storm complex	December 17–31, 2012	7.35 m (24.1 ft)	NA
Early February 2013 North American blizzard	February 7–18, 2013	6.44 m (21.1 ft)	NA
March 2013 Nor'easter	March 1–21, 2013	5.64 m (18.5 ft)	9.56 m (31.4 ft)
January 2015 North American blizzard	January 23–31, 2015	4.86 m (15.9 ft)	NA
October 2015 North American storm complex	September 29 – October 2, 2015	4.19 m (13.7 ft)	NA
January 2016 United States blizzard	January 19–29, 2016	7.01 m (23.0 ft)	8.36 m (27.4 ft)
February 2017 North American blizzard	February 6–11, 2017	3.67 m (12.0 ft)	6.28 m (20.6 ft)
February 12–14, 2017 North American blizzard	February 12–15, 2017	3.25 m (10.7 ft)	5.48 m (18.0 ft)
March 2017 North American blizzard	March 12–15, 2017	6.11 m (20.0 ft)	7.05 m (23.1 ft)
October 2017 North American storm complex	October 28–31, 2017	5.0 m (16.4 ft)	6.41 m (21.0 ft)
January 2018 North American blizzard	January 2–6, 2018	5.40 m (17.7 ft)	9.26 m (30.4 ft)
March 2018 Nor'easter	March 1–9, 2018	4.92 m (16.1 ft)	7.85 m (25.8 ft)
March 2018 Nor'easter	March 11–14, 2018	3.87 m (12.7 ft)	6.68 m (21.9 ft)
March 2018 Nor'easter	March 20–22, 2018	4.16 m (13.6 ft)	5.75 m (18.9 ft)
Early December 2020 Nor'easter	December 4–6, 2020	3.26 m (10.7 ft)	5.21 m (17.1 ft)
Mid-December 2020 Nor'easter	December 14–19, 2020	7.08 m (23.2 ft)	6.22 m (20.4 ft)
January/February 3, 2021 Nor'easter	January 31 – February 3, 2021	7.03 m (23.1 ft)	NA
April 2021 Nor'easter	April 15–17, 2021	1.86 m (6.10 ft)	NA
Late October 2021 Nor'easter	October 25–28, 2021	3.49 m (11.5 ft)	5.85 m (19.2 ft)
April 2022 Nor'easter	April 18–20, 2022	4.70 m (15.4 ft)	5.44 m (17.8 ft)
NA = Not Available indicates buoy metocean data was missing for the specified event.			

Table 8.3-2 Hurricanes and Tropical Storms with Highest Significant Wave Heights since 2012

Peak Significant Wave Heights at NOAA Station 44025 and 44066 for Named Storms			
Storm	**Date**	**Wave Height (44025)**	**Wave Height (44066)**
Hurricane Sandy	October 29-30, 2012	9.65 m (31.7 ft)	NA
Hurricane Joaquin	October 2-5, 2015	4.74 m (15.6 ft)	NA
Tropical Storm Jose	September19-22, 2017	4.17 m (13.7 ft)	6.29 m (20.6 ft)
Tropical Storm Philippe	October 29-30, 2017	3.38 m (11.1 ft)	5.91 m (19.4 ft)
Hurricane Florence	September 18, 2018	1.96 m (6.4 ft)	1.71 m (5.6 ft)
Hurricane Michael	October 12, 2018	2.89 m (9.5 ft)	4.68 m (15.4 ft)
Hurricane Dorian	September 7, 2019	3.72 m (12.2 ft)	5.4 m (17.7 ft)
Tropical Storm Melissa	October 11-13, 2019	4.6 m (15.1 ft)	6.5 m (21.3 ft)
Tropical Storm Fay	July 9-11, 2020	3.48 m (11.4 ft)	2.98 m (9.8 ft)
Hurricane Isaias	July 30–August 4, 2020	6.14 m (20.1 ft)	4.94 m (16.2 ft)
Hurricane Paulette	September 7-22, 2020	3.08 m (10.1 ft)	4.47 m (14.7 ft)
Hurricane Teddy	September 12-23, 2020	3.08 m (10.1 ft)	3.27 m (10.7 ft)
Hurricane Epsilon	October 19-26, 2020	2.74 m (9.0 ft)	3.02 m (9.9 ft)
Tropical Storm Claudette	June 19-22, 2021	1.71 m (5.6 ft)	NA
Tropical Storm Elsa	June 30–July 9, 2021	3.38 m (11.1 ft)	5.3 m (17.4 ft)
Hurricane Henri	August 15-23, 2021	2.57 m (8.4 ft)	3.48 m (11.4 ft)
Tropical Storm Odette	September 17-18, 2021	1.95 m (6.4 ft)	2.47 m (8.1 ft)

8.4 Archaeological Surveys

The geophysical surveys conducted in the two SAP study areas met BOEM guidelines for data acquisition and coverage. High-Resolution Geophysical (HRG) survey data, provided by Vineyard Mid-Atlantic, were used to identify magnetic anomalies, sonar contact, and sub-bottom acoustic reflectors within a 300 m by 300 m (984 ft by 984 ft) square area around each SAP study area centerpoint. These data were reviewed and assessed for cultural resources prior to the vibracore sampling. The lack of archaeological findings allowed the areas to be cleared for sampling.

RCG&A conducted an archaeological assessment of the geophysical remote sensing survey and geotechnical investigations conducted within the SAP-1 and SAP-2 areas, within Lease Area OCS-A 0544, in advance of the proposed installation of meteorological data collection buoys in two buoy deployment areas, which constitute the areas of potential effects (APEs). Review of remote sensing data within the two APEs identified no side scan sonar (SSS) contacts and one magnetic anomaly in the APE of SAP-2. There were no submerged cultural resources identified in either of the SAP APEs. Shallow- and medium-penetration sub-bottom

profiler (SBP) data were collected and analyzed to identify paleolandscape features. The seismic data indicated that no ancient submerged landforms (ASLFs) are present that may preserve inundated archaeological sites within the two APEs.

No historic properties were identified within the two APEs. It is concluded that no potential archaeological resources will be affected by the proposed installation, operation, and maintenance of met-ocean data collection buoys. Therefore, a determination of "No historic properties affected" (36 CFR 800.4) is recommended and concurrence with this recommendation is sought from BOEM.

For more detailed information regarding the cultural resource assessment of the SAP study areas refer to the RCG&A report in Appendix C.

8.5 Benthic Survey

To characterize surficial sediment conditions and to categorize benthic habitats in the two SAP study areas, sediment grab samples were collected and underwater video transects (obtained by a remotely operated vehicle [ROV]) were run in late summer of 2022 by TDI Brooks. Locations of benthic survey samples are shown in Figures 8.0-3 and 8.0-4.

Benthic infauna analysis was conducted on both SAP study areas grab samples which were then processed, analyzed, and interpreted for benthic infauna community characteristics by TDI Brooks. At SAP-1, the benthic grab (544LA22-GB019-1) contained 37 organisms, dominated by annelids (86.5%), including 32 polychaetes, 23 belonging to the genus Polygordius. At SAP-2, the benthic grab (544LA22-GB012-1) contained 15 organisms, again dominated by annelids (86.7%), including ten polychaetes and three oligochaetes. Annelids are the dominant infauna member within the SAP study areas and indicate a macrobenthic community typical of sandy, soft-bottom habitats. These results align with the soft bottom habitats observed throughout the video transects as well as with the benthic grab grain size analysis results, presented below.

In order to further characterize the benthic habitat, sediment was collected from the top 1-2 centimeters (cm) (0.39-0.79 in) of the grab samples to be analyzed for grain size distribution. This analysis was completed by TDI Brooks' geotechnical laboratory. Once grain size data were obtained, grab samples were classified using the NMFS Recommendations for Mapping Fish Habitat (NMFS 2021). This system is based on the Coastal and Marine Ecological Classification Standard (CMECS) system (FGDC 2012) and further modified by NMFS. Sediment from both SAP study areas was comprised of mainly fine unconsolidated sediment within the substrate subgroup of Medium Sand. Based on the results of the grain size analysis, both sample stations are classified as Soft Bottom habitats.

Video transects recorded bottom conditions and macrofauna and flora occurrence along two 300-m (984 ft) long transects, one per SAP study area. 544LA22-VT022-2 (VT022) was collected within SAP-1, while 544LA22-VT017-1 (VT017) was collected within SAP-2. Transect videos

were reviewed and organisms were identified (to the lowest practical taxonomic level) along the transect. After video analysis, an ACFOR (abundant, common, frequent, occasional, rare) scale was used to assign an abundance to each organism. Along both transects, the common sand dollar *(Echinarachnius parma)* was the most abundant organism, followed by hermit crabs (*Pagurus spp).* No flora were observed along either transect.

Bottom conditions along both transects were characterized by mostly flat sand with some benthic features (sand ripples). Scattered shell fragments and whole shells were observed in low to moderate densities along the entirety of both transects, within the troughs of the benthic features. Additionally, transect footage showed a frequent occurrence of small, isolated depressions/burrows possibly created by sea scallop activity. Figures (8.5-1 and 8.5-2) are representative images of habitats seen along VT022 and VT017. Similar to the grab samples collected in the areas, both video transects were assigned a benthic habitat type of Soft Bottom being comprised mostly of sand.

Review of underwater video transects, sediment grabs, vibracore photographs, and analysis around the planned metocean buoy and TRBM deployment locations found no evidence of sensitive or complex habitats; no evidence of sensitive macrofaunal communities; and only limited epifaunal activity. No aquatic vegetation, evidence of fishing activity, encrusting or colonial organisms, or anthropogenic debris were observed on the footage from video transects.

For complete and detailed information on benthic sampling and results, please refer to the information in Appendix D.

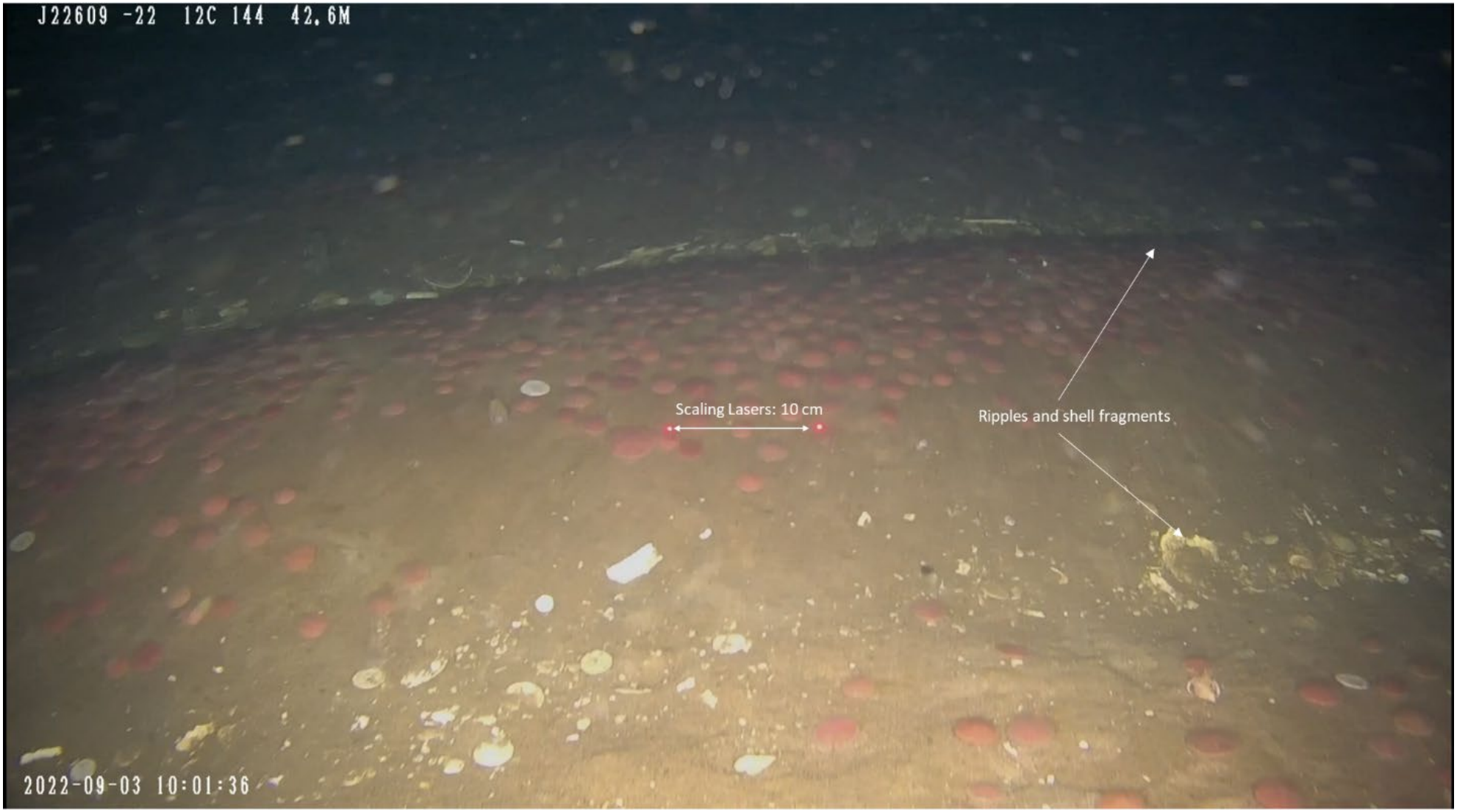

Figure 8.5.1
Video Transect VT022 Screen Captures

Figure 8.5.2
Video Transect VT022 Screen Captures

VINEYARD MID-ATLANTIC
VINEYARD OFFSHORE

Figure 8.5.3
Video Transect VT017 Screen Captures

9.0 AFFECTED ENVIRONMENT, POTENTIAL IMPACTS, AND MITIGATION MEASURES

9.1 Categories to Be Assessed

As required in 30 CFR §585.610(a), 30 CFR §585.610(b)(1-5), 30 CFR §585.611(b)(1) and 30 CFR §585.659(2) and in conformance with Table 2 of BOEM's SAP Guidance, the following sections describe existing conditions based on the field surveys described in Section 8.0 (see also Section 3.2):

- Hazard information
- Geotechnical surveys
- Biological surveys
- Archaeological resources
- Air quality

Potential impacts to these resources from proposed SAP activities and measures to avoid, minimize or mitigate these impacts are described below.

9.2 Surficial and Shallow Subsurface Geology

For both SAP study areas, based on the sediments found on and below the seafloor in the upper three meters (homogenous fine to medium grained sand), there will be negligible to minor impact from installation and operation of the metocean buoy and TRBM. These impacts include (1) some typical settling of the mooring weight and TRBM into the seabed, (2) minor scour possible around the mooring weight and TRBM, and (3) chain sweep on the seafloor around the weight. The absence of any sizable mobile seafloor features (megaripples or sand waves) suggest minimal bottom currents are operating in the area, so scour is expected to be minimal. The seafloor disturbance from the metocean buoy and TRBM is described in Section 4.2.

9.3 Shallow Hazards

None of the surficial or subsurface features identified within the SAP study areas limits are considered hazards due to their minimal sizes and locations relative to the proposed metocean buoy weight and TRBM deployment positions. As there are no hazards identified on or below the seafloor in either SAP study area, there will be no impact from installation of the metocean buoy and TRBM. Furthermore, there are no anticipated hazardous or adverse conditions that could significantly impact the metocean buoy system or TRBM.

9.4 Benthic Resources

Direct, minor impact on the benthos from installation of the metocean buoy system and placement of the TRBM would include some injury and possibly mortality of epifauna and infauna from the mooring weight sinking into the seabed and the TRBM placement on the

seabed. This will consolidate and displace benthic habitats, forcing organisms into surrounding areas. Indirect impacts from suspended sediment on the surrounding seafloor immediately after mooring weight placement are expected to be negligible due to very little expected resuspended material.

Some habitat alteration may occur temporarily, as a new hard substrate is introduced where a relatively soft sediment seabed existed previously. Sessile benthic communities (encrusting) may inhabit the mooring weight and/or the TRBM during their deployment period.

Operational impacts from the mooring chain sweep are anticipated to be negligible to minor, as the chain does not sink very far into the seabed but will create a dynamic equilibrium at the sediment-water interface due to the periodic scraping of the seafloor. The area of impact will be controlled by the tidal current flow and/or ocean circulation.

Finally, direct, minor impact from removal of the metocean buoy system and/or TRBM is expected in the form of injury or mortality to epifaunal communities attached to the mooring weight when it is removed from the seafloor. Subsequent recolonization of the underlying unconsolidated sediment by original epifaunal and infaunal organisms will occur fairly rapidly, given the limited area of impact and the large surrounding area of undisturbed habitat. Similar to installation, mooring removal will have negligible impact due to very little resuspended sediments mobilized into the water column.

In summary, the overall small area of impact compared to the large source area of similar undisturbed habitat adjacent to it, is expected to result in rapid recovery of benthic resources following removal of the metocean buoy and TRBM, as has been observed following temporary physical disturbance in similar habitats (e.g., Guerra-García et al. 2003, Schaffner 2010). Thus, potential long-term impacts to benthic resources from SAP activities are anticipated to be negligible, if any.

9.5 Oceanography and Meteorology

The placement of a metocean buoy and/or TRBM in either of the SAP study areas will not significantly affect the ocean current circulation or wind and wave patterns locally or regionally. The footprint of the mooring weight, diameter of the mooring cable, size of the buoy, and overall dimensions of the TRBM are not large and will not cause significant impact to the flow of air or water.

The only negligible-minor impact will be slight turbulent flow created from the mooring weight and TRBM just above the bottom and the resultant localized and limited scour around the weight. While there are no measurements of bottom current speed and direction in the SAP study areas or Lease Area OCS-A 0544, the seafloor features present are not indicative of fast-moving currents. Therefore, only a minor amount of scour around the mooring weight and TRBM is predicted.

9.6 Archaeological Resources

No impacts to archaeological resources are expected, as no recorded or potential historic or pre-contact submerged cultural resources have been identified within either of the SAP study areas.

9.7 Air Quality

EPA has air quality jurisdiction over the portion of the Outer Continental Shelf where the proposed SAP activities will take place (see 30 CFR §585.659). However, EPA's OCS Air Regulations, which establish federal air pollution control requirements for OCS sources, do not apply to the proposed activities (see 40 CFR §55). That is because the metocean buoy and TRBM will not contain any combustible fuel and will not have the potential to emit any criteria air pollutants. Instead, the metocean buoy and TRBM will be powered by clean, renewable energy (e.g., batteries, solar, wind, and/or fuel cells). In addition, the vessels used for the deployment, maintenance, and recovery of the metocean buoy and TRBM will not attach to the seafloor (i.e., anchor) or securely attach to the metocean buoy for the purposes of remaining stationary. Therefore, none of the equipment or vessels involved in the proposed activities will become OCS sources subject to regulation under 40 CFR §55.

Although the proposed activities are not regulated under 40 CFR §55, there will be emissions from the main propulsion engines, auxiliary engines, and auxiliary equipment on vessels that are used to deploy, maintain, and recover the metocean buoy and TRBM. In order for BOEM to assess impacts to air quality resulting from the proposed activities, a conservative estimate of emissions was developed based on the following assumptions:

- Installation of the metocean buoy and TRBM at the SAP study area will take approximately six hours and will require one vessel trip from Avalon, NJ (see Section 5.1).

- Annually, maintenance of the metocean buoy and TRBM will require approximately four vessel trips from New York Harbor, with each maintenance activity lasting approximately one eight-hour day (at the SAP study area).

- The metocean buoy and TRBM will be deployed for five years.

- Decommissioning of the metocean buoy and TRBM at the SAP study area will take up to approximately eight hours and will require one vessel trip from Avalon, NJ.

The table below provides an estimate of the total tons of nitrogen oxides (NOx), volatile organic compounds (VOC), carbon monoxide (CO), particulate matter with a diameter less than or equal to 10 and 2.5 micrometers (PM_{10} and $PM_{2.5}$, respectively), sulfur dioxide (SO_2), carbon dioxide equivalent (CO_2e), and hazardous air pollutants (HAPs) emitted during the installation, maintenance, and decommissioning of the metocean buoy and TRBM.

Table 9.7-1 Air Emissions from SAP Activities

Activity	Air Emissions (US tons)							
	NOx	VOC	CO	PM_{10}	$PM_{2.5}$	SO_2	CO_2e	HAPs
Deployment	0.57	0.01	0.14	0.02	0.02	0.00	39	0.00
Maintenance	5.63	0.10	1.35	0.19	0.19	0.02	384	0.02
Decommissioning	0.58	0.01	0.14	0.02	0.02	0.00	40	0.00
Total	**6.78**	**0.12**	**1.63**	**0.23**	**0.22**	**0.02**	**463**	**0.02**

Air emissions associated with the installation, maintenance, and decommissioning of the metocean buoy and TRBM will only occur periodically for very short durations throughout the Site Assessment term. Since the SAP Study Areas are approximately 58 kilometers (36 miles) at their closest (SAP-2) from the nearest landmass, the emissions within the SAP Study Areas are unlikely to have any effect on onshore areas. Furthermore, the low level of additional vessel traffic from the proposed activities will likely contribute only a small fraction of air pollution that is already caused by marine vessel traffic within the region. As described in Section 9.7.1, measures to minimize emissions from vessels used during deployment, maintenance, and decommissioning of the metocean buoy and TRBM will be consistent with industry standard, area-wide measures for marine vessels (e.g., the use of low sulfur fuels and internal combustion engines that are in compliance with applicable air quality regulatory standards). Thus, the potential impacts of the proposed activities to ambient air quality are expected to be negligible, if any.

9.7.1 Avoidance, Minimization, and Mitigation Measures

The metocean buoy and TRBM will not contain any combustible fuel and will not have the potential to emit any criteria air pollutants. Instead, the metocean buoy and TRBM will be powered by clean, renewable energy (e.g., batteries, solar, wind, and/or fuel cells). Measures to avoid, minimize, and mitigate emissions from vessels will be consistent with industry standard, area-wide measures for marine vessels. For example, air emissions from vessels will be minimized through the use of low sulfur fuels and through the use of internal combustion engines that are in compliance with applicable air quality regulatory standards.

9.8 Marine Mammals, Sea Turtles, and Other Protected Species

ESA-listed species that may be present in the study areas and surrounding region are presented in Table 9.8-1.

Table 9.8-1 ESA-Listed Species That May Be Present in the Study Areas

Common Name	Scientific Name	ESA Status
Marine Mammals - Cetaceans		
North Atlantic right whale	*Eubalaena glacialis*	Endangered
Fin whale	*Balaenoptera physalus*	Endangered
Sei whale	*Balaenoptera borealis*	Endangered
Sperm whale	*Physeter macrocephalus*	Endangered
Blue whale	*Balaenoptera musculus*	Endangered
Sea Turtles		
Loggerhead sea turtle	*Caretta*	Threatened
Green sea turtle	*Chelonia mydas*	Threatened
Kemp's ridley turtle	*Lepidochelys kempii*	Endangered
Leatherback sea turtle	*Dermochelys coriacea*	Endangered
Fishes		
Atlantic sturgeon	*Acipenser oxyrinchus*	Endangered
Giant manta ray	*Manta birostris*	Threatened

9.8.1 Avoidance, Minimization, and Mitigation Measures

As required by Section 7 of the ESA, BOEM completed a programmatic consultation with NMFS for data collection activities such as the deployment of metocean buoys. On June 29, 2021, NMFS issued a Letter of Concurrence under the ESA that covers site characterization (HRG, geotechnical, and biological surveys) and site assessment/data collection (deployment, operation, and retrieval of meteorological and oceanographic data buoys) activities associated with Atlantic OCS leases. As a result of this consultation, PDCs and BMPs associated with the mitigation, monitoring, and reporting conditions have been developed for those data activities covered in the consultation. These PDCs and BMPs collectively implement the ESA requirements for these offshore wind activities on the Atlantic OCS. The Proponent will follow all applicable PDCs/BMPs as provided in the June 29, 2021 NMFS Letter of Concurrence. The Proponent will provide a copy of the most-recent PDCs and BMPs on every project-related vessel. Further, the Proponent will comply with applicable regulations in Table 3.1-1, applicable Lease stipulations in Table 3.1-2 (which also include a requirement to follow the PDCs and BMPs for protected species) and implement best management practices in Table 9.9-1 to eliminate or minimize the potential for adverse environmental impacts to protected species and other significant resources during metocean buoy and TRBM installation, operation, and decommissioning.

9.9 Additional Avoidance, Minimization, and Mitigation Measures

9.9.1 Measures to Reduce Impacts to Fisheries

In accordance with Lease Stipulation 3.1.2.1, the Proponent has developed a publicly available FCP that describes the ways the Proponent will communicate with fisheries stakeholders potentially affected by the development of the Proponent's offshore wind projects (including activities pertaining to metocean buoys). The document continues to evolve with continuous feedback and guidance from fishermen, fishing organizations, and regulatory agencies. The FCP includes contact information for individuals retained by the Proponent as its primary point(s) of contact with fisheries stakeholders (i.e., the Fisheries Liaison(s)). The current version of the FCP can be found at the following website link: **https://www.vineyardoffshore.com/fishermen**.

9.9.2 Measures to Reduce Impacts to Marine Navigation

As listed on Table 9.9-1 under Transportation and Vessel Traffic, the metocean buoy will be equipped with the proper safety lighting, markings, and signal equipment per USCG PATON requirements, including USCG Navigation and Vessel Inspection Circular 02-23. Coordination with the USCG will occur prior to deployment (see Table 3.3-1).

The metocean buoy will be sited within the NYB WEA, which, after public comment, was developed to avoid shipping lanes and International Maritime Organization (IMO)-designated Traffic Separation Schemes. The Proponent will issue Offshore Wind Mariner Updates and coordinate with USCG to issue Local Notices to Mariners for buoy deployment, maintenance, and recovery activities.

The metocean buoy will be located beyond Federal Aviation Administration (FAA) jurisdiction, will not exceed 61 m (200 ft) in height and therefore do not require any aviation obstruction lighting per BOEM's (2021) Guidelines for Lighting and Marking of Structures Supporting Renewable Energy Development.

9.9.3 Measures to Reduce Impacts to Birds and Bats

As noted in Section 2.3 in BOEM's 2021 EA for the NYB WEA, impacts to birds and bats are negligible. Due to the low height and simple design of metocean buoy, there are few opportunities for avian species to perch or nest. Further, in accordance with Lease Stipulation 5.4 (see Table 3.1-2), the Proponent will comply with all avian and bat survey and reporting requirements. Additional findings are presented under Avian Resources in Table 9.9-1.

9.9.4 Best Management Practices

The SAP activities will comply with BOEM's BMPs outlined in Attachment B of BOEM's (2019) Guidelines for Information Requirements for a Renewable Energy Site Assessment Plan. Table 9.9-1 identifies how the SAP activities will address or adhere to all of BOEM's BMPs that are

applicable to metocean buoys. As stated in Section 9.8.1, the Proponent will also follow all applicable PDCs/BMPs as provided in the June 29, 2021 NMFS Letter of Concurrence to implement avoidance, minimization and mitigation measures.

Table 9.9-1 BOEM's SAP Best Management Practices

Best Management Practices: BOEM 2019 SAP Guidance	SAP Activities
Preconstruction Planning	
Lessees shall minimize the area disturbed by preconstruction site monitoring and testing activities and installations.	This SAP proposes the use of one metocean buoy and TRBM to obtain Lease-specific data. Buoys minimize disturbed areas as compared with meteorological towers. Similarly, the Proponent's preconstruction geophysical and geotechnical survey work is designed to minimize impacts in accordance with approved survey plans and lease requirements. Wildlife studies have employed minimally invasive techniques for observing species and habitat presence.
Lessees shall contact and consult with the appropriate affected Federal, state, and local agencies early in the planning process.	The Proponent has engaged with federal, state, local agencies, and stakeholder groups to identify and address any issues of potential concern. This engagement has informed the design of the Project and the activities presented in the SAP.
Lessees shall consolidate necessary infrastructure requirements whenever practicable.	The Proponent has made every effort to consolidate infrastructure requirements. The maximum horizontal radius of the mooring chain contacting the seafloor will not be more than 71.0 m (234 ft) and will be within the assessed 300 m x 300 m (984 ft by 984 ft) buoy deployment area. Any impact from installation vessels will be very limited, as the installation will be performed without anchoring.
Lessees shall develop a monitoring program to ensure that environmental conditions are monitored during construction, operation, and decommissioning phases. The monitoring program requirements, including adaptive management strategies, and shall be established at the project level to ensure that potential adverse impacts are mitigated.	A monitoring program should be commensurate with potential impacts from a proposed activity. The Proponent's monitoring program for each metocean buoy and TRBM includes appropriate marine notifications of buoy locations, including issuance of Offshore Wind Mariner Updates and coordination with USCG to issue Local Notices to Mariners for buoy deployment, maintenance, and recovery activities; on-going locational monitoring of the buoy system by GPS and alerts if the buoy moves outside the designated buoy

Table 9.9-1 BOEM's SAP Best Management Practices (Continued)

Best Management Practices: BOEM 2019 SAP Guidance	SAP Activities
Preconstruction Planning	
	watch circle; efforts to minimize and remove marine debris associated with SAP activities; submission of compliance reports to BOEM as required, including recommendations for adaptive management measures; and removal of each metocean buoy and TRBM systems as described in Section 7.0.
Seafloor Habitats[1]	
Lessees shall conduct seafloor surveys in the early phases of a project to ensure that the alternative energy project is sited appropriately to avoid or minimize potential impacts associated with seafloor instability or other hazards.	The Project is located within the New York Bight Wind Energy Area (NYB WEA), which BOEM has identified as appropriate for development of wind energy. In addition, the Proponent has conducted geophysical and geotechnical surveys under a BOEM-approved Survey Plan, to confirm that site conditions are suitable for the installation of the metocean buoy and TRBM.
Lessees shall conduct appropriate pre-siting surveys to identify and characterize potentially sensitive seafloor habitats and topographic features.	Pre-siting surveys have been conducted to identify and characterize potentially sensitive seafloor habitats and topographic features. See Sections 8.0 and 9.0 and related appendices for detailed findings. No sensitive seafloor habitats have been identified within the metocean buoy and TRBM deployment study areas.
Lessees shall avoid locating facilities near known sensitive seafloor habitats, such as coral reefs, hard-bottom areas, and chemosynthetic communities.	No sensitive seafloor habitats have been identified within the metocean buoy and TRBM deployment study areas.
Lessees shall avoid anchoring on sensitive seafloor habitats.	Installation of the metocean buoy and TRBM will be performed without vessel anchoring. The mooring weight for each buoy will not be placed on sensitive seafloor habitats, as none have been identified in the study areas.
Lessees shall reduce scouring action by ocean currents around foundations and to seafloor topography by taking all reasonable measures and employing periodic routine inspections to ensure structural integrity.	There will be no foundations. Little to no scour development around the chain and TRBM is expected due to minimal currents and relatively cohesive seabed conditions. The Proponent will conduct periodic inspections of the metocean buoy and TRBM.

Table 9.9-1 BOEM's SAP Best Management Practices (Continued)

Best Management Practices: BOEM 2019 SAP Guidance	SAP Activities
Marine Mammals and Sea Turtles[1]	
Vessels related to project planning, construction, and operation shall travel at reduced speeds when assemblages of cetaceans are observed, and maintain a reasonable distance from whales, small cetaceans, and sea turtles as determined during site-specific consultations.	The Proponent will adhere to legally mandated speed, approach, and other vessel requirements included in BOEM's PCDs/BMPs, unless BOEM approves a waiver. Additional measures to protect marine mammals and sea turtles are described in Section 9.8.1.
Lessees shall minimize potential vessel impacts to marine mammals and turtles by requiring project-related vessels to follow the National Marine Fisheries Service (NMFS) Regional Viewing Guidelines while in transit. Operators shall be required to undergo training on applicable vessel guidelines.	Project vessels will comply with the NMFS Regional Viewing Guidelines while in transit (see Section 9.8.1). In addition, vessel operators will undergo training on applicable guidelines.
Lessees shall use the best available mooring systems using buoys, lines (chains, cables, or coated rope systems), swivels, shackles, and anchors that prevent any potential entanglement or entrainment of marine mammals and sea turtles, while ensuring the safety and integrity of the structure or device.	The metocean buoy and TRBM will utilize entanglement or entrainment avoidance measures agreed upon with BOEM and NMFS. These are expected to include using a single steel chain to link the bottom mooring weight with the floating buoy (see Section 4.1). All attachment lines will utilize one or more of the following measures to reduce entanglement risk: shortest practicable line length, rubber sleeves, weak-links, chains, cables, or similar equipment types that prevent lines from looping or wrapping around animals or entrapping protected species. No entanglement or entrainment of marine mammals and sea turtles is expected.
Lessees shall locate cable landfalls and onshore facilities so as to avoid impacts to known nesting beaches.	The metocean buoy and TRBM will not require any cable landfalls or onshore facilities.

Table 9.9-1 BOEM's SAP Best Management Practices (Continued)

Best Management Practices: BOEM 2019 SAP Guidance	SAP Activities
Fish Resources and Essential Fish Habitat[1]	
Lessees shall conduct pre-siting surveys (may use existing data) to identify important, sensitive, and unique marine habitats in the vicinity of the projects and design the project to avoid, minimize, or otherwise mitigate adverse impacts to these habitats.	Pre-siting surveys have been conducted to identify and characterize potentially sensitive marine habitats. See Section 9.0 for detailed findings. No sensitive marine habitats have been identified within the metocean buoy and TRBM deployment study areas.
Lessees shall minimize seafloor disturbance during construction and installation of the facility and associated infrastructure.	Seafloor disturbance will be minimized to the extent practicable. The maximum expected horizontal radius of the mooring chain contacting the seafloor will not be more than 71.0 m (234 feet) and will be within the 300 m x 300 m (984 ft by 984 ft) buoy deployment area. Any impact from installation vessels will be very limited, as the installation will be performed without anchoring.
Avian Resources	
The lessee shall evaluate avian use in the project area and design the project to minimize or mitigate the potential for bird strikes and habitat loss. The amount and extent of ecological baseline data required will be determined on a project-to-project basis.	Avian use and impacts to avian resources due to the installation of the metocean buoy was thoroughly analyzed for the entire NYB WEA in BOEM's (2021) Final Environmental Assessment (EA). The Revised EA found that impacts to birds are expected to be negligible. The low profile of the metocean buoy will minimize the avian use of the buoy as a perch or nesting site.
Lessees shall take measures to reduce perching opportunities.	The Revised EA found that meteorological buoys provide few perching opportunities for birds and that those opportunities would pose no threat to birds.
Lessees shall comply with FAA and USCG requirements for lighting while using lighting technology (e.g., low-intensity strobe lights) that minimize impacts to avian species[2].	Marine navigation lighting on the metocean buoy will comply with USCG requirements and are expected to have characteristics that minimize impacts to avian species.
Lessees shall work cooperatively with commercial/recreational fishing entities and interests to ensure that the construction and operation of a project will minimize potential conflicts with commercial and recreational fishing interests.	As described in BOEM's Revised EA, "activities related to the installation/operation of the meteorological towers and buoys would not measurably impact commercial or recreational fishing activities."

Table 9.9-1 BOEM's SAP Best Management Practices (Continued)

Best Management Practices: BOEM 2019 SAP Guidance	SAP Activities
Avian Resources	
Lessees shall review planned activities with potentially affected fishing organizations and port authorities to prevent unreasonable fishing gear conflicts. Lessees shall minimize conflict with commercial fishing activity and gear by notifying registered fishermen of the location and time frame of the project construction activities well in advance of mobilization with updates throughout the construction period.	The SAP study areas for the metocean buoy and TRBM were selected to avoid heavily trawled areas. The Proponent will issue Offshore Wind Mariner Updates and coordinate with USCG to issue Local Notices to Mariners for buoy deployment, maintenance, and recovery activities. Coordinates for the buoy will be provided to fishermen and mariners.
Lessees shall use practices and operating procedures that reduce the likelihood of vessel accidents and fuel spills.	The Proponent is firmly committed to full compliance with applicable safety and environmental protection regulations and codes. The oil spill response measures are described in Section 4.4.
Lessees shall avoid or minimize impacts to the commercial fishing industry by marking applicable structures (e.g., wind turbines, wave generation structures) with USCG-approved measures (such as lighting) to ensure safe vessel operation.	The metocean buoy and TRBM will be equipped with the proper safety lighting, markings, and signal equipment per USCG PATON requirements, including USCG Navigation and Vessel Inspection Circular 02-23. Coordination with the USCG will occur prior to deployment (see Table 3.3-1).
Coastal Habitats[1]	
Lessees shall avoid hard-bottom habitats, including seagrass communities and kelp beds, where practicable, and restore any damage to these communities.	No sensitive seafloor habitats have been identified within the metocean buoy and TRBM deployment study areas.
Lessees shall implement turbidity reduction measures to minimize effects to hard-bottom habitats, including seagrass communities and kelp beds, from construction activities.	No hard-bottom habitats have been identified within the metocean buoy and TRBM deployment study areas.
Lessees shall minimize effects to seagrass and kelp beds by restricting vessel traffic to established traffic routes.	No sensitive seafloor habitats have been identified within the metocean buoy and TRBM deployment study areas. If sensitive resources are known along transit routes, vessels will be advised to avoid the area to the greatest extent practicable.

Table 9.9-1 BOEM's SAP Best Management Practices (Continued)

Best Management Practices: BOEM 2019 SAP Guidance	SAP Activities
Coastal Habitats	
Lessees shall site alternative energy facilities to avoid unreasonable interference with major ports and United States Coast Guard (USCG)-designated Traffic Separation Schemes.	The metocean buoy and TRBM will be sited within the NYB WEA, which, after public comment, was developed to avoid shipping lanes and IMO-designated Traffic Separation Schemes.
Lessees shall meet FAA guidelines for sighting and lighting of facilities.	The metocean buoy will be located beyond FAA jurisdiction, will not exceed 61 m (200 ft) in height and therefore do not require any aviation obstruction lighting per BOEM's (2021) *Guidelines for Lighting and Marking of Structures Supporting Renewable Energy Development*.
Lessees shall place proper lighting and signage on applicable alternative energy structures to aid navigation per USCG circular navigation and vessel inspection circular 07-02 (USCG 2007) and comply with any other applicable USCG requirements.	The metocean buoy and TRBM will be equipped with the proper safety lighting, markings, and signal equipment per USCG PATON requirements, including USCG Navigation and Vessel Inspection Circular (NVIC) 02-2023. Coordination with the USCG will occur prior to deployment (see Table 3.3-1).
Operations	
Lessees shall prepare waste management plans, hazardous material plans, and oil spill prevention plans, as appropriate, for the facility.	The Proponent is firmly committed to full compliance with applicable environmental protection regulations and codes. The Project's Oil Spill Response measures are described in Section 4.4.

Notes:

1. The Proponent will follow all applicable PDCs/BMPs as laid out in the June 29, 2021 NMFS Letter of Concurrence (see Section 9.8.1).
2. This text summarizes stipulations in BOEM's 2019 SAP Best Management Practices. The Proponent understands that the USCG has worked with BOEM to develop standard language for use in COP and/or SAP approvals and that the conditions of SAP approval will supersede the Best Management Practices. The Proponent understands that the USCG's suggested standard language is: "Nothing in this condition supersedes or is intended to conflict with the lighting, marking, and signaling requirements of the FAA, USCG, or BOEM. The Lessee must use lighting technology that minimizes impacts on avian species to the extent practicable including lighting designed to minimize upward illumination."

10.0 REFERENCES

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Vineyard Mid-Atlantic Site Assessment Plan

Appendix A

Buoy Specifications

Prepared by:
EOLOS/Ocean Tech

Prepared for:
Vineyard Mid-Atlantic LLC

January 2024

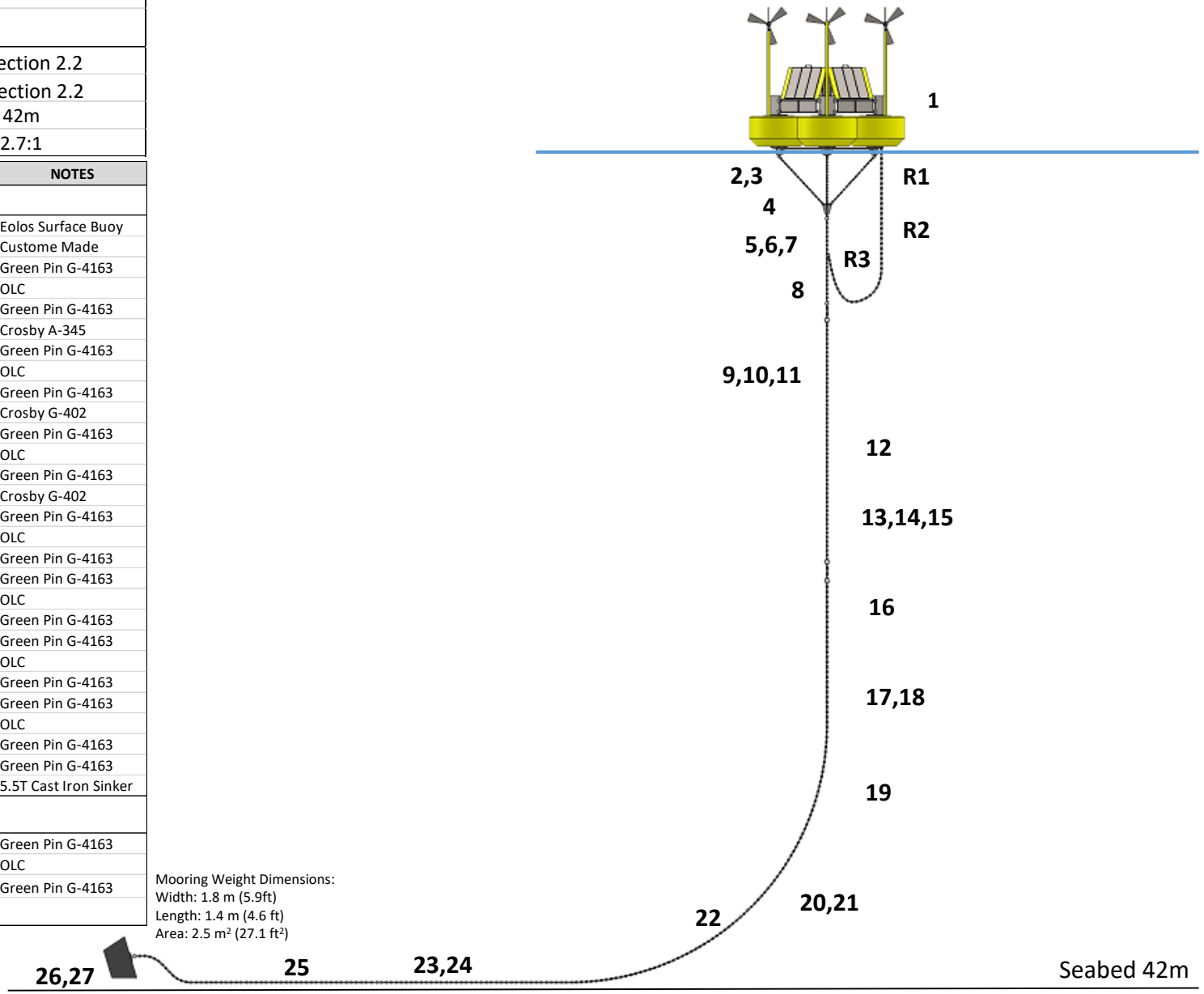
PRELIMINARY MOORING DESIGN
VINEYARD MID-ATLANTIC, OCS-544
Eolos FLS200 Floating Lidar and Metocan Buoy

DATE	27 October, 2022	**LATITUDE**	See Section 2.2
REVISION		**LONGITUDE**	See Section 2.2
CREATED BY	SPO	**WATER DEPTH**	42m
MOORING LENGTH	113m	**MOORING SCOPE**	2.7:1

Item #	DESCRIPTION	SIZE	WLL[1]	LENGTH	NOTES
	Mooring				
1	FLS-200	FLS-200			Eolos Surface Buoy
2	(4) Isolation shackle and pin	1-1/4" (32mm)			Custome Made
3	(4) Shackle (bow)	1-1/4" (32mm)	12T		Green Pin G-4163
4	(4) Bridle chain	1" (26mm)		3m	OLC
5	(4) Shackle (bow)	1-1/4" (32mm)	12T		Green Pin G-4163
6	Master Link Assembly	1-1/2" (38mm)	30.5T		Crosby A-345
7	Shackle (bow)	1-3/8" (35mm)	13.5T		Green Pin G-4163
8	Chain	1" (26mm)		10m	OLC
9	Shackle (bow)	1-3/8" (35mm)	13.5T		Green Pin G-4163
10	Swivel	1-1/2" (38mm)			Crosby G-402
11	Shackle (bow)	1-1/2" (38mm)	17T		Green Pin G-4163
12	Chain	1-1/2" (38mm)		10m	OLC
13	Shackle (bow)	1-1/2" (38mm)	17T		Green Pin G-4163
14	Swivel	1-1/2" (38mm)			Crosby G-402
15	Shackle (bow)	1-1/2" (38mm)	17T		Green Pin G-4163
16	Chain	1-1/2" (38mm)		27.5m	OLC
17	Shackle (bow)	1-1/2" (38mm)	17T		Green Pin G-4163
18	Shackle (bow)	1-1/2" (38mm)	17T		Green Pin G-4163
19	Chain	1-1/2" (38mm)		27.5m	OLC
20	Shackle (bow)	1-1/2" (38mm)	17T		Green Pin G-4163
21	Shackle (bow)	1-1/2" (38mm)	17T		Green Pin G-4163
22	Chain	1-1/2" (38mm)		27.5m	OLC
23	Shackle (bow)	1-1/2" (38mm)	17T		Green Pin G-4163
24	Shackle (bow)	1-1/2" (38mm)	17T		Green Pin G-4163
25	Chain	1-1/2" (38mm)		10.5m	OLC
26	Shackle (bow)	1-1/2" (38mm)	17T		Green Pin G-4163
27	Shackle (bow)	1-3/4" (44mm)	25T		Green Pin G-4163
28	5,000 Kg Anchor	5,000 kg			5.5T Cast Iron Sinker
	Recovery Line				
1	Shackle (bow, hung on FLS-200 hook)	7/8" (23mm)	6.5T		Green Pin G-4163
2	Chain	3/4" 19mm)		12m	OLC
3	Shackle (bow, secured to 10m mooring chain)	7/8" (23mm)	6.5T		Green Pin G-4163

1 - Working Load Limit

Mooring Weight Dimensions:
Width: 1.8 m (5.9ft)
Length: 1.4 m (4.6 ft)
Area: 2.5 m² (27.1 ft²)



Vineyard Mid-Atlantic Site Assessment Plan

Appendix B

CONFIDENTIAL Geophysical, Geotechnical & Environmental Survey Reports for Site Assessment Plan

Prepared by:
Fugro and TDI-Brooks International, Inc.

Prepared for:
Vineyard Mid-Atlantic LLC

January 2024

This Appendix has been redacted in its entirety.

Vineyard Mid-Atlantic Site Assessment Plan

Appendix B-1

CONFIDENTIAL Geophysical Survey Reports for Site Assessment Plan

Prepared by:
Fugro

Prepared for:
Vineyard Mid-Atlantic LLC

January 2024

This Appendix has been redacted in its entirety.

Vineyard Mid-Atlantic Site Assessment Plan

Appendix B-2

CONFIDENTIAL Geotechnical & Environmental Survey Reports for Site Assessment Plan

Prepared by:
TDI-Brooks International, Inc.

Prepared for:
Vineyard Mid-Atlantic LLC

January 2024

This Appendix has been redacted in its entirety.

Vineyard Mid-Atlantic Site Assessment Plan

Appendix C

CONFIDENTIAL Archaeological Report for Site Assessment Plan

Prepared by:
R. Christopher Goodwin & Associates, Inc

Prepared for:
Vineyard Mid-Atlantic LLC

January 2024

This Appendix has been redacted in its entirety.

Vineyard Mid-Atlantic Site Assessment Plan

Appendix D

Biological Survey Report for Site Assessment Plan

Prepared by:
Geo SubSea LLC

In association with:

TDI-Brooks International, Inc & TRC

Prepared for:
Vineyard Mid-Atlantic LLC

January 2024

Vineyard Mid-Atlantic

Benthic Environmental Report

544 SAP Environmental Survey

Prepared By: Geo SubSea LLC

In Association With:

TDI-Brooks & TRC

Prepared For:

Vineyard Offshore LLC

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List of Acronyms and Abbreviations

ACFOR	Abundant, Common, Frequent, Occasional and Rare
BMCC	R/V Brooks McCall
BOEM	Bureau of Ocean Energy Management
CMECS	Coastal and Marine Ecological Classification System
DGPS	Digital Global Positioning System
GSA	Grain Size Analysis
H'	Shannon-Weiner Diversity Index
HDPE	high density polyethylene
J'	Pielou's Evenness
LPTL	Lowest Practical Taxonomic Level
NMFS	National Marine Fisheries Service
NYB WEA	New York Bight Wind Energy Area
QC	Quality Control
ROV	Remotely Operated Vehicle
SAP	Site Assessment Plan
TDI-Brooks	TDI-Brooks International, Inc.
USBL	Ultra Short Baseline

1. INTRODUCTION

TDI-Brooks International, Inc. (TDI-Brooks), with primary support from TRC and CR Environmental LLC (collectively, the benthic environmental survey team), conducted a benthic environmental survey in support of Vineyard Offshore's (the Proponent) efforts to promote further site characterization studies for the permitting, siting, and design for Vineyard Mid-Atlantic in Bureau of Ocean Energy Management (BOEM) Lease Area OCS-A 544 (Lease Area) within the New York Bight Wind Energy Area (NYB WEA). This survey was conducted from August to September of 2022 and included the collection and analysis of underwater video transects and benthic grabs from within the Lease Area. The grab samples and video imagery data conclusions presented within this Appendix will support interpretation of geophysical data to characterize surficial sediment conditions and classify the benthic habitats in the Lease Area for inclusion in the Site Assessment Plan (SAP) for BOEM. Habitat interpretations were determined according to the National Marine Fisheries Service (NMFS) Recommendations for Mapping Fish Habitat (NMFS, 2021). This system is based on the Coastal and Marine Ecological Classifications Standards (CMECS; FGDC, 2012) and further modified by NMFS.

The Proponent has identified two study areas (SAP-1 and SAP-2) within the Lease Area, one of which will be used for the installation of a meteorological and/or oceanographic (metocean) buoy and a supplemental wave and current sensor placed on the seafloor (referred to as a Trawl Resistant Bottom Mount [(TRBM]). The focus of this report is to document the benthic conditions in support of the proposed metocean buoy and TRBM deployment in one of the SAP study areas. Samples from the remainder of the Lease Area OCS-A 0544 (544) will be summarized in a following report. This document provides the following information for samples collected within the designated SAP study areas:

- A description of the benthic grab sampling methods, results, and analysis;
- The analysis of benthic grab sampling results using key statistical analyses such as taxa richness, density per cubic meter, and community composition;
- A description and analysis of the video data collected; and
- CMECS classifications of each sample site based on the video, grain size, and benthic community lab results.

2. METHODS

2.1 Field Survey

TDI Brooks mobilized the vessel RV Brooks McCall (BMCC) in April and October of 2022 in Fall River, Massachusetts to provide benthic environmental survey support associated with the Proponent's development and installation of Vineyard Northeast (OCS-A 0522). Field operations for OCS-A 0544 Geotechnical and Environmental Survey Campaign were conducted during a period between field acquisition for Vineyard Northeast OCS-A 0522 Geotechnical and Environmental Survey Campaign. TRC supported TDI-Brooks with onboard collection of benthic infauna samples and underwater video transects (Figure 2.1-1 and 2.1-2).

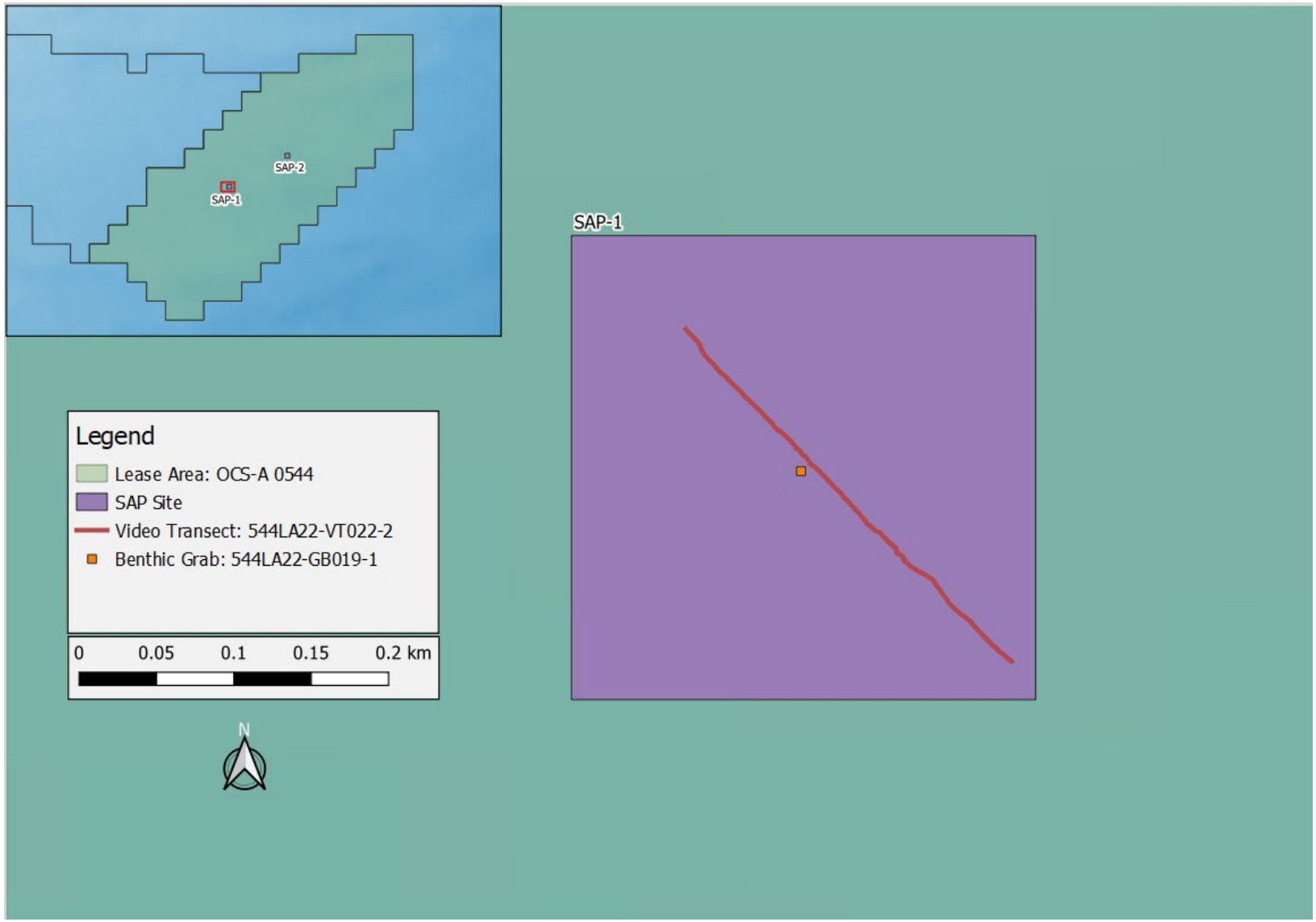


Figure 2.1-1 Map of OCS-A 0544 SAP-1 underwater video transect (VT022) and sediment grab sample station (GB019)

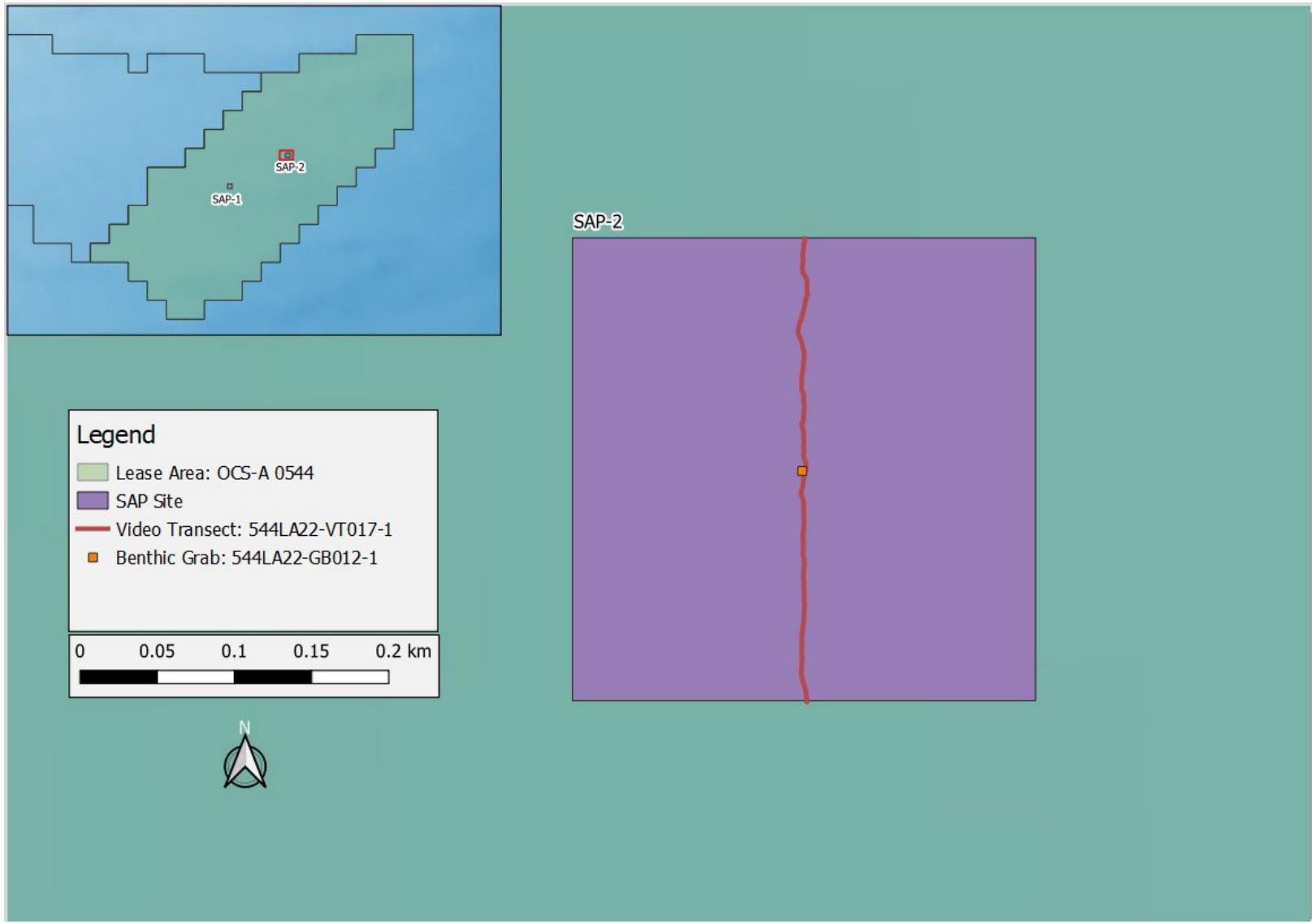


Figure 2.1-2 Map of OCS-A 0544 SAP-2 underwater video transect (VT017) and sediment grab sample station (GB012).

2.1.1 Underwater Video Transects

Video imagery was collected from the BMCC with a small commercial inspection Remotely Operated Vehicle (ROV), the DeepTrekker REVOLUTION (refer to TDI-Brooks Field Report #22-4333 for full technical specifications in Appendix C-1). The ROV was equipped with 6 ½ HP thrusters, two 1,000 Lumen LED floodlights, a 1080p HD integrated camera, a GoPro Hero 9, and scaling lasers (scaling distance of 10 cm). A TDI-Brooks pilot controlled the ROV integrated camera's field of view which was angled forward and slightly downward. The ROV was controlled with an integrated control box via the ROV's tether. An Ultra short baseline (USBL) acoustic tracking system interfaced with a Digital Global Positioning System (DGPS) was used to track the location of the ROV on the seafloor. A remote beacon transponder mounted on the ROV was used to relay signals to the USBL system. To navigate the ROV, the USBL/DGPS system was connected to a laptop running WinFrog navigation software on the vessel. Real-time positions of the vessel and ROV were recorded in one second intervals.

Underwater video transects were performed on a 24-hour operations schedule. Transects were targeted for 300 meters (m) in length with 50-100 m lead ins for ROV approach. Video transects generally ranged from fifteen to thirty-four minutes in length with an average duration of approximately twenty-one minutes. Both SAP area transects averaged around eighteen minutes in duration. At each station, the ROV was towed by the vessel in drift mode, slightly above the seafloor, at speeds ranging from 0.14 to 1.02 knots. Video imagery was monitored in real time to ensure data quality and was obtained using digitally recorded built-in camera feed and GoPro recordings.

Onboard data processing and storage was handled by personnel trained to use this specific system. Imagery and associated positional data were reviewed to ensure accurate recording of metadata. The metadata are descriptive data sources composed of information that TDI/TRC used to process the images. Backup data were also collected and later used for further quality checks.

Several quality control (QC) conventions (i.e., decision rules) were required to address the image quality and transect performance. Weather, sea state (e.g., currents), and underwater visibility constrained the acceptability of the both the ROV positioning and video quality. The acceptable limits were defined by data post-processing capabilities (i.e., ability to identify substrate and organisms) and ensured a consistent standard for all imagery collected. Unacceptable imagery was either rejected or aborted onboard, based on environmental or technical complications, by trained analysts and/or ROV operators. The rejected and/or aborted transects were re-attempted either immediately after retrieving the ROV, or at a later time when site conditions improved. For video transects acquired within the SAP study areas, only one of the two transects (544LA22-VT022) required a second attempt.

2.1.2 Grab Sampling

The benthic grab samples collected from the BMCC were obtained using a 0.25 m^2 (0.3-m deep) box core sediment sampler. A GoPro Hero 9 was mounted to the box corer and recorded *in situ* HD video for each benthic sample location. Grain size and infauna samples, when collected together (as was the case for both SAP stations), were collected from different portions of the retained box corer sample.

After retrieval, each sample was examined for quality and a decision was made to accept or reject the sample based on sediment volume and representativeness of the grab. Sample grabs showing evidence of uneven penetration (i.e., angled sample) or washout were rejected as unrepresentative and incomplete. In these cases, the grab was redeployed until an acceptable sample was retained. Additionally, the target recovery for infauna grab samples was a depth of 10 cm. Sample grabs that did not retain at least 8 cm of material or showed evidence of uneven penetration (i.e., angled sample) were rejected as unrepresentative and incomplete. In these cases, the grab was redeployed until an acceptable sample was retained.

Once an acceptable sample was retrieved, undisturbed sample material was photographed from above on deck. Then a set area was subsampled from each infauna grab sample, for which a plastic core liner was used as a reference. The diameter of the core liner used for field subsampling was 6.99 cm (2.75 in). Two core liners were used for each primary subsample and each backup subsample. Grain size samples were collected from the top 3 cm of sediment retained within the benthic grab sampler (surrounding the cores) and were stored in plastic bags for grain size analysis.

Field descriptions of sample recovery and sediment type (i.e., grain size) were recorded for each grab sample. Additionally, the presence of large or abundant organisms was noted. Depending on the depth of the material retained in the sampler, the top 8-10 cm of sediment in one side of the grab was removed using the core liner and a stainless-steel spoon to prevent loss of material. Material was transferred to a 500-µm bucket sieve and gently rinsed with seawater to remove fine sediments.

Sieved samples were then fixed in a solution containing 10% buffered formalin in seawater. Fixed samples were stored on the survey vessel in high density polyethylene (HDPE) quart-size sample jars and labeled with the project name, sample identification code, sampling date, preservative, and the initials of the collector. Preserved samples were returned to TRC offices for storage and laboratory analysis of benthic infauna.

2.2 Lab Analysis

2.2.1 Grain Size Analysis

Grain size analysis was completed by TDI-Brooks' geotechnical laboratory. Samples were dried at 110 ± 5 °C in an oven overnight, or longer for fine-grained samples and were then disaggregated in a ceramic mortar by either a rubber pestle or a ceramic pestle, depending on the hardness of the aggregates.

A gradation-representative specimen of the dried, disaggregated sample was weighed, then sieved through a sieve stack (with sieve number and order per client's request). The specimen-bearing sieve stack was then securely mounted on a mechanical shaker and was shaken for 10 minutes. Afterwards, sediment retained on each sieve and collected in the bottom pan were separately collected into pre-weighed tins and weighed. The mass of sediment retained on each sieve and collected in the bottom pan was then calculated by subtracting the tin mass from the total mass of sediment and tin. The sum of retained sediment mass was compared against the initial specimen mass for QC purposes. A retest was conducted if mass change was over 5% of the initial specimen mass.

Sediment mass/weight values for each sieve/grain size category were recorded in a project Excel spreadsheet and converted to percentage of the total sample for creation of grain size cumulative plots. After importing the grain size data, gradation plots were generated in Excel and included as an appendix, allowing comparison of primary sediment classification between sample locations.

2.2.2 Benthic Infauna Analysis

Upon receipt at TRC's infaunal analysis laboratory, each sample was logged in and decanted through a 500-µm sieve. Samples were gently rinsed in the sieve to remove the formalin fixative and any additional fine sediment that remained after the initial field sieving process. Once thoroughly rinsed, each sample was returned to a labeled jar and preserved with 70% ethanol for storage. Once preserved, the primary subsamples proceeded to the sorting stage. Backup subsamples were held but not processed further.

For sorting, the contents of each sample were examined using a high-power dissecting microscope (7X to 45X magnification) and high-intensity gooseneck fiber optic lamp. Organisms found during the sorting process were removed with forceps and placed in 70% ethanol. Each vial was labeled with the project name, collection date, and sample identification number. All residue (sediment and organic matter) from the sorted and unsorted portion of each sample was placed in a separate labeled container and re-preserved in 70% ethanol.

Sorted organisms were subsequently identified by a qualified taxonomist to the lowest practical taxonomic level (LPTL) using a dissecting microscope and readily available taxonomic keys and references (e.g., Bartholomew, 2001; Martinez, 1999; Pollock, 1998; Abbott and Morris, 1995; Weiss, 1995; Gosner, 1978; Bousfield, 1973; Gosner, 1971; Smith, 1964; Pettibone, 1963). Temporary slide mounts were prepared for oligochaete worms, capitellid polychaetes, and certain

amphipod taxa as necessary to improve the taxonomic precision of identification for these groups. Slide-mounted organisms were identified under a compound microscope capable of 64X to 1600X magnification.

For quality assurance and control (QA/QC) purposes, a second qualified staff member (quality assurance officer) re-sorted 10% of the samples (or one, whichever was greater) analyzed by each sorter to ensure organisms were being adequately removed from the samples. The quality assurance officer checked the sorted sample material for remaining organisms and calculated an efficiency rating (*E*) using the following formula:

$$E = 100 \times \frac{n_a}{n_a + n_b}$$

Where n_a is the number of individuals originally sorted and verified as identifiable organisms by the QC checker and n_b is the number of organisms recovered by the QC checker. If the original sorter achieved $E < 90\%$ (i.e., less than 90% of the organisms in the sample removed), corrective action was taken to ensure greater sorting efficiency for other samples sorted by the same individual. Corrective action includes, but is not necessarily limited to, additional training on organism recognition and re-sorting of sample material.

2.3 Video Data Post-Processing

2.3.1 Objectives

Underwater videos were used to estimate relative species abundance of macro-organisms, identify point substrates (standalone boulders or anthropogenic gear), classify bottom substrate types, and mark any notable habitat features present on each 300-m transect line.

2.3.2 Methods

Each video was viewed in its entirety, a minimum of twice, to focus on different annotations. The first viewing was focused on flora, fauna, biogenic features, point substrates, and miscellaneous event notes; while the second viewing was focused on video quality, classifications of continuous substrates, and identification of seafloor features. Videos were viewed on VLC Media Player at 0.70x speed.

Identification of fauna was completed to the LPIL for video imagery by marine taxonomists. To ensure accurate and consistent flora and fauna identifications, video analysts consulted taxonomic reference guides (e.g., Kells and Carpenter, 2011; Martinez, 1999; Taylor and Villalard, 1972). Although the target identification level for fish and macroinvertebrates was genus/species, some identifications were left at a higher taxonomic level, especially if a specimen could not be confidently identified due to video quality, obscured diagnostic features, or other complicating factor.

No flora was identified along either transect within the SAP areas, therefore, flora identification methodology has been excluded from this report.

Observations of fauna were noted and assigned an overall relative abundance as categorized by the ACFOR scale (abundant, common, frequent, occasional, and rare). This method provides a generalized characterization of taxa distribution along the video transects. The ACFOR method is a semi-quantitative scale often used for the rapid assessment of species composition and abundance. The following category definitions were used for the evaluation of underwater video transects:

- Abundant: observed in high densities (individuals per unit area) over the majority of the transect. An example of this would be the extensive fields of common sand dollar *(Echinarachnius parma)* observed along both transects.
- Common: observed many times over the course of the transect, but in moderate densities.
- Frequent: observed several times over the course of the transect but in low densities or patchy distribution of high-density occurrences.
- Occasional: observed multiple times over the course of the transect in very low densities (one to two individuals per occurrence) or infrequent patchy distribution of moderate density occurrences.
- Rare: present, but infrequently observed over the course of the transect (typically limited to a single individual).

Video analysts assigned transect substrate types based on the NMFS 2021 guidelines, defined in "Updated Recommendations for Mapping Fish Habitat" guidance dated March 29, 2021.

2.4 Benthic Infauna Data Post-Processing

2.4.1 Taxonomic Composition

2.4.1.1 Macrofaunal Density

Macrofaunal density is a measure of abundance expressed as an estimate of the number of individuals per unit area. Although macrofaunal density can reflect the productivity of marine habitats (Taylor, 1998), it may also serve as an indication of stress or disturbance at a location (Dean, 2008). Consequently, the density of benthic organisms may increase or decrease in response to different types of stress (e.g., thermal or chemical pollution, sediment deposition, physical abrasion or displacement) (Dean, 2008; Thrush and Dayton, 2002).

The density of benthic organisms responds to disturbance as mitigated by the tolerance (or preference) of a given organism to the particular source of disturbance. However, density may vary substantially over small areas or short periods of time and should therefore be interpreted cautiously. For this study, macrofaunal density is expressed as the number of organisms per square meter.

2.4.2 Richness, Diversity, Evenness

2.4.2.1 Shannon Diversity

The Shannon index is a univariate summary measure of diversity that is influenced by both the number of taxa in a sample and the evenness of organism distribution between taxa, and is calculated as follows:

$$\text{Shannon Index } (H') = 1 \sum_{i=1}^{n} p_i \ln p_i$$

Where p_i is the proportion of total individual represented by taxa I, ln is the natural log, and n is the number of taxa. Lower Shannon index values indicate lower diversity (samples with only one taxa will have a Shannon index of 0), and higher values indicate increasing diversity. Diversity increases both with greater taxa richness and with great uniformity in the distribution of organisms between taxa. PRIMER v7 was used to calculate Shannon diversity using enumeration data for each sample.

2.4.2.2 Pielou's Evenness

Pielou's evenness is a univariate summary measure of the evenness of organism distribution between different taxa within a sample, and is calculated as follows:

$$\text{Pielou's Evenness } (J') = \frac{H'}{\ln S}$$

Where H' is the Shannon diversity index value and ln*S* is the maximum possible Shannon diversity index value (H'_{max}). Pielou's evenness is constrained between 0 and 1, with higher values indicating greater evenness (in a sample where all taxa are represented at the same density Pielou's evenness would equal 1). PRIMER v7 was used to calculate Pielou's evenness using enumeration data for each sample.

3. RESULTS

3.1 Video Analysis

Characteristics and location of two priority SAP underwater video transects within the 544 lease area are described in Table 3.1-1 and shown in Figure 2.1-1 and Figure 2.1-2. Run-in/out distances were removed to accurately constrain the distance of each transect so that only the designated areas of each proposed line were then used for analysis.

Table 3.1-1 Underwater video transect details for two proposed 544 SAP areas.

Site	Transect	Date	Duration (min)	Length (m)	Start Time	End Time	Equipment
SAP-1	VT022	9/3/2022	~18 mins.	300	10:00	10:18	DeepTrekker REVOLUTION
SAP-2	VT017	9/1/2022	~17.5 mins.	300	09:51	10:08	DeepTrekker REVOLUTION

3.1.1 Fauna Counts

Relative abundance, localized density and taxonomic identification of visible invertebrates and fish were recorded during the video review process. Organisms were identified to the LPTL, usually Order or Family. Among the common groups were hermit crabs (Paguridae) observed 45 and 73 times respectively, in VT022 and VT017 (Figure 3.1-1). Sea scallops were seen frequently along both transects. The most abundant organism was the common sand dollar, *Echinarachnius parma*, present in high abundance along both SAP transects.

Table 3.1.1-1 Fauna counts from review of the two video transects at potential SAP areas.

LPTL	Common Name	Counts per Transect		ACFOR	
		SAP-1 VT022	SAP-2 VT017	SAP-1 VT022	SAP-2 VT017
Cerianthidae	Burrowing Anemone	4	1	Occasional	Rare
Cancer borealis	Cancer Crab	3	3	Occasional	Occasional
Pisces	Fish		1		Rare
Pleuronectidae	Flounder		1		Rare
Paguridae	Hermit Crab	45	73	Common	Common
Polychaeta	Polychaete		1		Rare
Placopecten magellanicus	Sea Scallop	10	14	Frequent	Frequent
Luecoraja sp.	Skate		1		Rare
Leucoraja sp.	Skate Egg Case		1		Rare
Cliona	Sponge	1	2	Occasional	Rare

Table 3.1.1-1 Fauna counts from review of the two video transects at potential SAP areas (Continued)

LPTL	Common Name	Counts per Transect		ACFOR	
		SAP-1 VT022	SAP-2 VT017	SAP-1 VT022	SAP-2 VT017
Busycon carica	Whelk (knobbed)		1		Rare
Naticidae	Moon Snail Eggs	1		Rare	
Gastropoda	Snail	1		Rare	
Echinarachnius parma	Common Sand Dollar	100s	100s	Abundant	Abundant

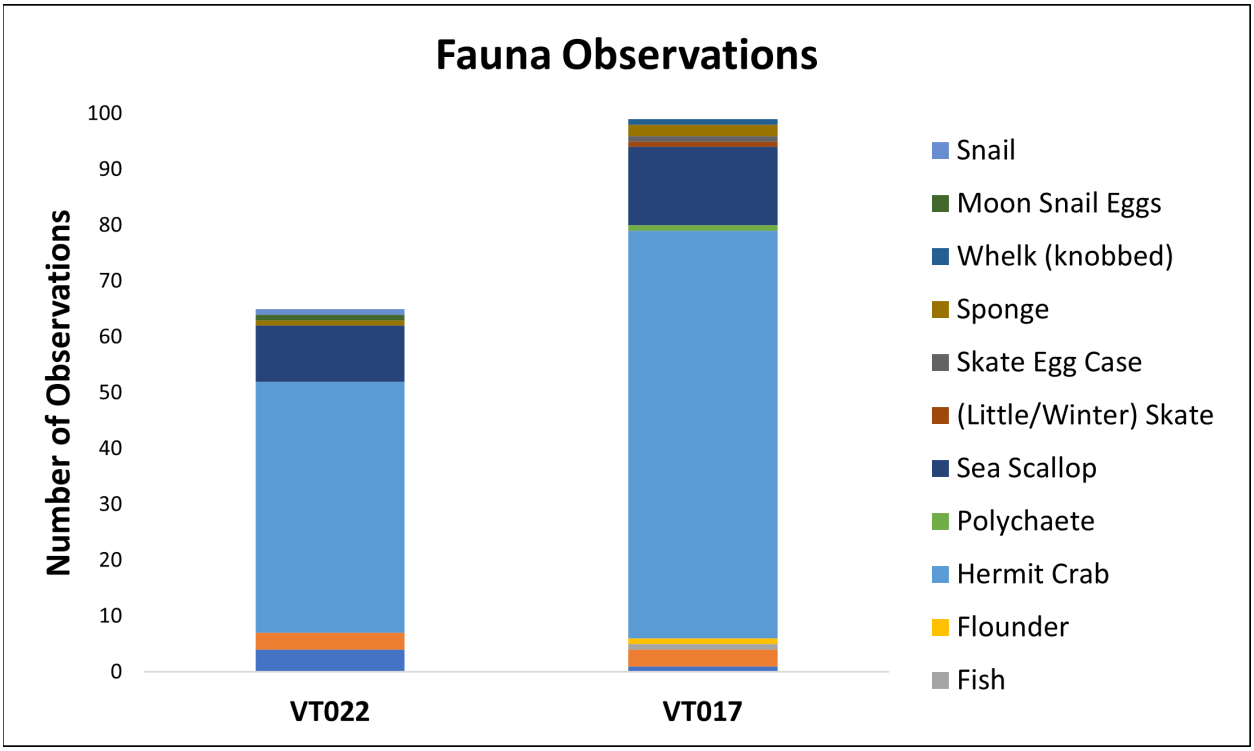


Figure 3.1.1-1 Observed fauna from proposed SAP study areas.

*Note: Sand dollars have been removed from the above figure as the extremely high number of observations caused the appearance of the graphs to be skewed.

3.2 Grab Samples

A total of two priority grab samples were made in the 544 Lease Area, one sample (GB019) was taken in SAP-1, the second sample (GB012) was taken in SAP-2 (Table 3.2-1).

Table 3.2-1 Location, Date of Grab Sampling, and Depth for 544 SAP sites.

Site	Sample	Date	X	Y	Water Depth (m)
SAP-1	544LA22-GB019	9/2/2022	4455599.67	661218.35	42.3
SAP-2	544LA22-GB012	9/1/2022	4457571.34	664878.73	43.2

3.2.1 Sediment Analysis

Results of particle size distribution analyses from TDI-Brooks are presented from two grab samples collected in the 544 Lease Area SAP areas. Samples from the two grabs, GB019 and GB012 were generally sandy, comprised of 98.09 % and 97.81 % sand, respectively (Table 3.2.1-1). Only a tiny fraction of gravel-sized particles was present in samples (Figure 3.2.1-1). GB012 had a higher proportion of Gravel (2.15%) and Fine Sand (55.36%) compared to GB019 (1.14% and 42.75%, respectively).

Table 3.2.1-1 Grain size composition with sand type and percentage of total shown.

Sample	% Gravel (> 4.75 mm)	% Coarse Sand (2-4.75 mm)	% Medium Sand (0.41-2 mm)	% Fine Sand (0.075-0.41 mm)	Silt and Clay (< 0.075 mm)	Total Sand
GB019	1.14	11.52	45.35	42.75	0.12	98.09
GB012	2.15	11.35	32.96	55.36	0.04	97.81

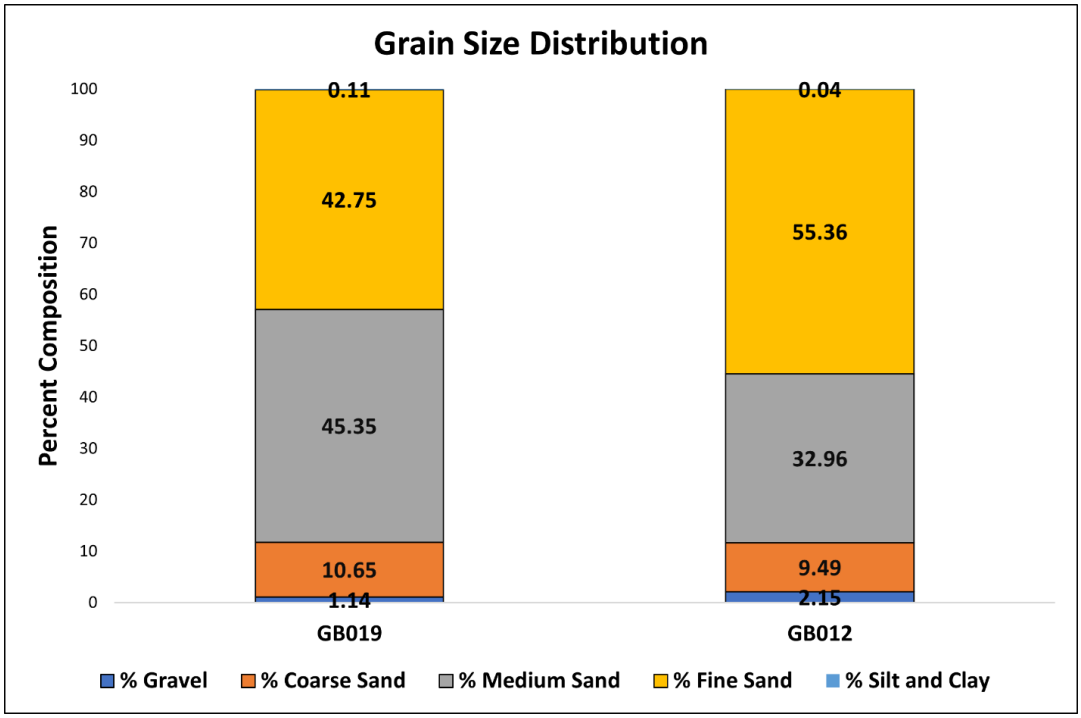


Figure 3.2.1-1 Distribution of particle size classes among the two grab samples collected from the potential SAP study areas.

3.2.2 Benthic Community Analysis

3.2.2.1 Taxonomic Composition

Two successful grab samples at the SAP areas yielded a total of 52 individuals from 5 phyla with 13 unique taxa groups identified to the lowest practical taxonomic level (LPTL). Annelida was the dominant phyla accounting for 86% of the total abundance (Figure 3.2.2.1-1) and more than half of the unique taxa found within the samples (Figure 3.2.2.1-2, Table 3.2.2.1-1).

Table 3.2.2.1-1 Phyla present in two benthic grab samples.

Phyla	Dominant Genera/Species	Density (Individuals m^{-2})	Number of Taxa
Annelida	Polygordius, Glycera	2,935	7
Arthropoda	*Byblis serrata, Phoxocephalus sp.*	195	3
Mollusca		130	1
Echinodermata	*Echinarachnius parma*	65	1
Nemertea	Ribbon Worms	65	1
Totals		**3392**	**13**

Infauna abundance was greater at SAP-1 with 37 individuals found in grab GB019 compared to 15 individuals in grab GB012 at SAP-2 (Figure 3.2.2.1-1). Percent composition for each phyla at individual SAP areas is shown in Figure 3.2.2.1-3 and Table 3.2.2.1-2.

Table 3.2.2.1-2 Phylum abundance (number of individuals) within each grab sample.

Station	Annelida	Arthropoda	Molllusca	Echinodermata	Nemertea	Total Abundance
SAP-1	32	2	2	1	0	37
SAP-2	13	1	0	0	1	15
Totals	**45**	**3**	**2**	**1**	**1**	**52**

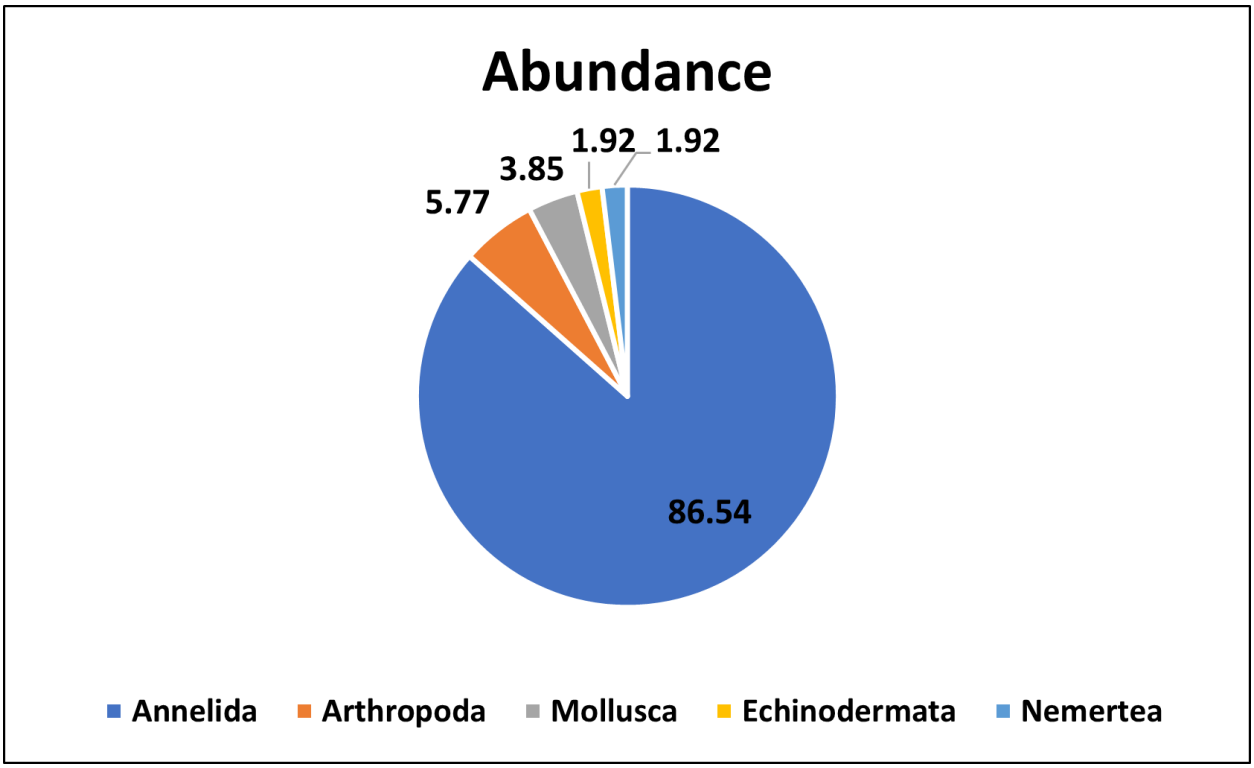


Figure 3.2.2.1-1 Proportion of abundance of infauna individuals within each phylum for SAP-1 and SAP-2 sites.

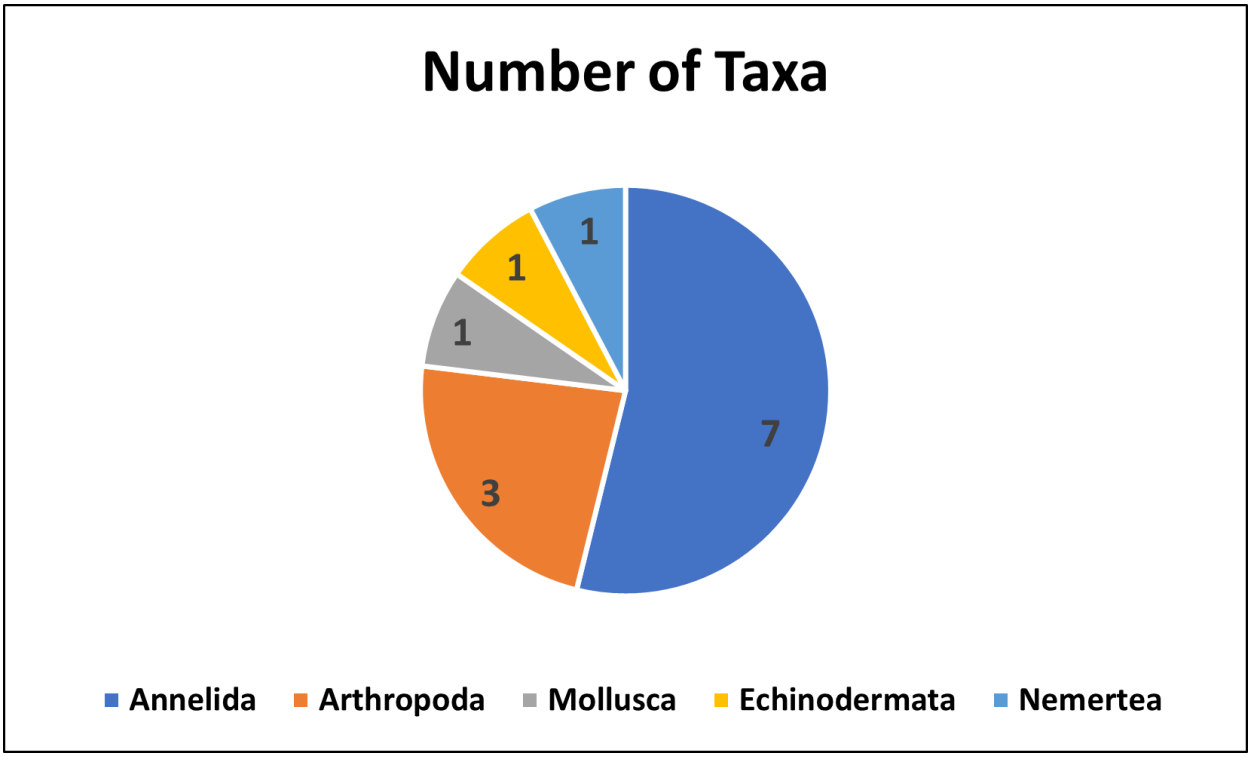


Figure 3.2.2.1-2 Number of identified taxa within each Phylum.

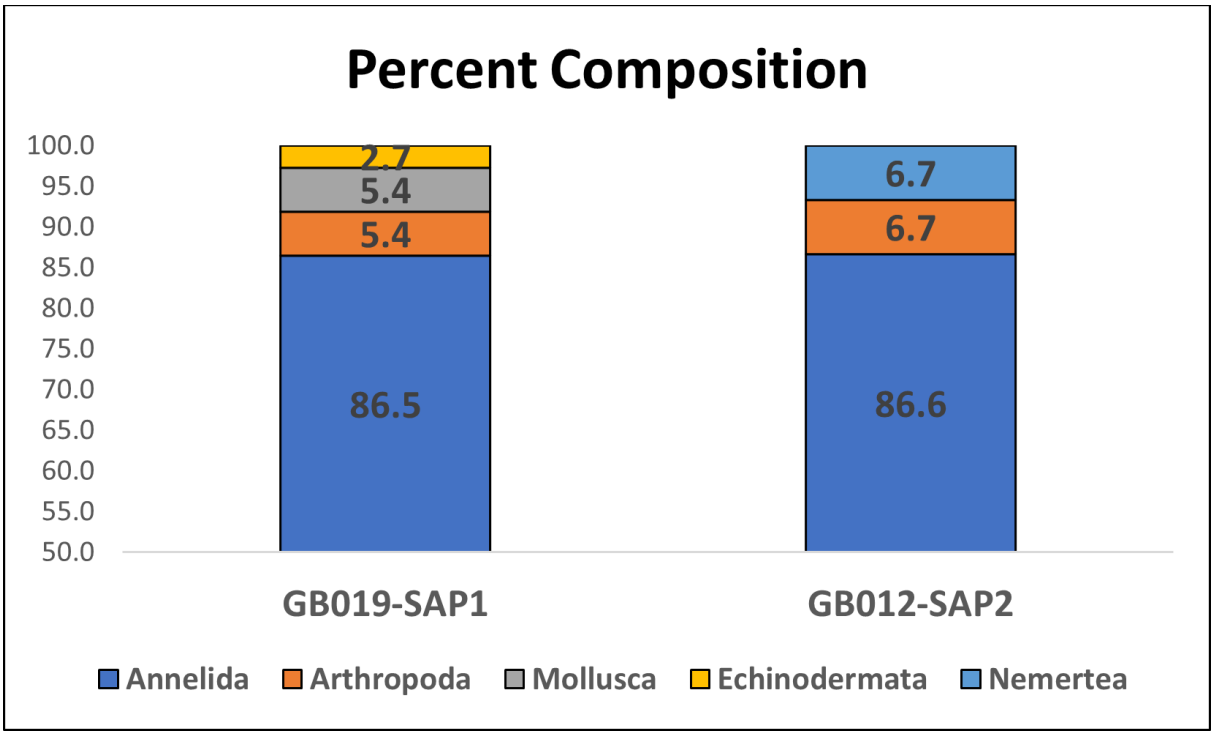


Figure 3.2.2.1-3 Composition of infauna as a percentage of the total community within a phylum.

3.2.2.2 SAP-1 GB019

Infauna community numbers were dominated by annelids at SAP-1 with 32 of the total 37 individuals in the Class Polychaeta. Among the polychaetes, a single species, *Scalibregma inflatum*, was numerically dominant, responsible for 72% of the abundance among all invertebrates enumerated (Table 3.2.2.2-1). Annelida, Arthropoda, and Mollusca accounted for all but one individual at this site.

Table 3.2.2.2-1 Abundance and density of infauna found in benthic grab sample from SAP-1.

Phyla	Family or LPTL	Abundance (#)	Density (Ind. m^{-2})
Annelida	*Polygordius sp.*	23	3001
	Scoletoma sp.	2	261
	Scalibregma inflatum	1	130
	Goniadidae	5	652
	Ampharetidae	1	130
Total Annelida		**32**	**4175**
Arthropoda	Tanaidacea	1	130
	Byblis serrata	1	130
Total Arthropoda		**2**	**260**
Mollusca	Bivalvia	**2**	**260**
Echinodermata	*Echinarachnius parma*	**1**	**130**
Total Abundance at SAP-1 – GB019		**37**	**4828**

3.2.2.3 SAP-2 GB012

Organisms collected in GB012 at SAP-2 belonged to three phyla with one individual for both Arthropoda and Nemertea. The other 13 individuals belonged to Annelida (Table 3.2.2.3-1). Annelids were evenly spread among 4 taxa, including Nadid oligochaetes. *Polgordius* sp. was the most abundant annelid with 5 individuals.

Table 3.2.2.3-1 Abundance and density of infauna found in benthic grab sample from SAP-2.

Phyla	Family or LPTL	Abundance (#)	Density (Ind. m^{-2})
Annelida	*Polygordius sp.*	5	652
	Glycera capitata	3	391
	Scalibregma inflatum	2	260
	Nadidae with chaeta hair	3	391
Total Annelida		**13**	**1696**
Arthropoda	*Phoxocephalus sp.*	**1**	**130**
Nemertea	Nemertea	**1**	**130**
Total Abundance at SAP-2 – GB012		**15**	**1957**

3.2.3 Richness, Diversity, and Evenness

Taxonomic richness among the two grab samples was similar; however, the distribution of species or LPTL affected the ecological measures of health. SAP-1 was characterized by a high richness value (Margalef's d) due to the greater number of taxa, but overall diversity and evenness was suppressed due to the dominance of *Scalibregma inflatum* in the sample (Table 3.2.3-1). SAP-2 was a more diverse (H') and had a more equitable spread of species as a community despite a lower number of individuals found or taxa represented.

Table 3.2.3-1 Ecological metrics of infauna communities at two SAP sites.

Station	Density (Ind. m^{-2})	# of Taxa	Ecological Indices		
			Richness (d)	Diversity (H')	Evenness (J')
SAP-1	4,175	23	2.2155	1.3694	0.62324
SAP-2	1,826	5	1.8463	1.6397	0.91514
Average	**3392**	**14**	**2.031**	**1.505**	**0.769**

4. CMECS CLASSIFICATIONS

Benthic habitats in the two analyzed video transects (one per SAP) were classified in accordance with NMFS 2021 guidelines, defined in "Updated Recommendations for Mapping Fish Habitat" guidance dated March 29, 2021. This guidance modifies the Coastal and Marine Ecological Classification Standard (CMECS) for use in classifying benthic habitats for offshore wind projects. A simplified graphic depicting the NMFS-modified CMECS approach is presented as a decision tree in Figures 4-1 and 4-2. Classifications were determined based on visual observations in the transect videos and supported by grain size analysis (GSA) results from the nearby sediment grabs. Additionally, sediment grabs were assigned (NMFS modified) CMECS classifications based on GSA results.

Figure 4-3 shows the images of each grab sample after retrieval, along with their assigned CMECS substrate subgroup classifications, while Figures 4-4 to 4-6 depict screen captures of representative conditions observed along the video transects as well as their assigned habitat types and primary substrate type.

Grab samples retrieved from both SAP areas were classified under the CMECS substrate subgroup of Medium Sand (both ~ 98%). Additionally, all substrate observed along both video transects falls within the CMECS substrate group of Sand. In summary, as observed in the grab samples and video imagery, and suggested by the sonar reflectivity interpreted over the remainder of the area, the two SAP areas are designated entirely as soft bottom habitat with lesser percentages of shells and gravel which define this classification.

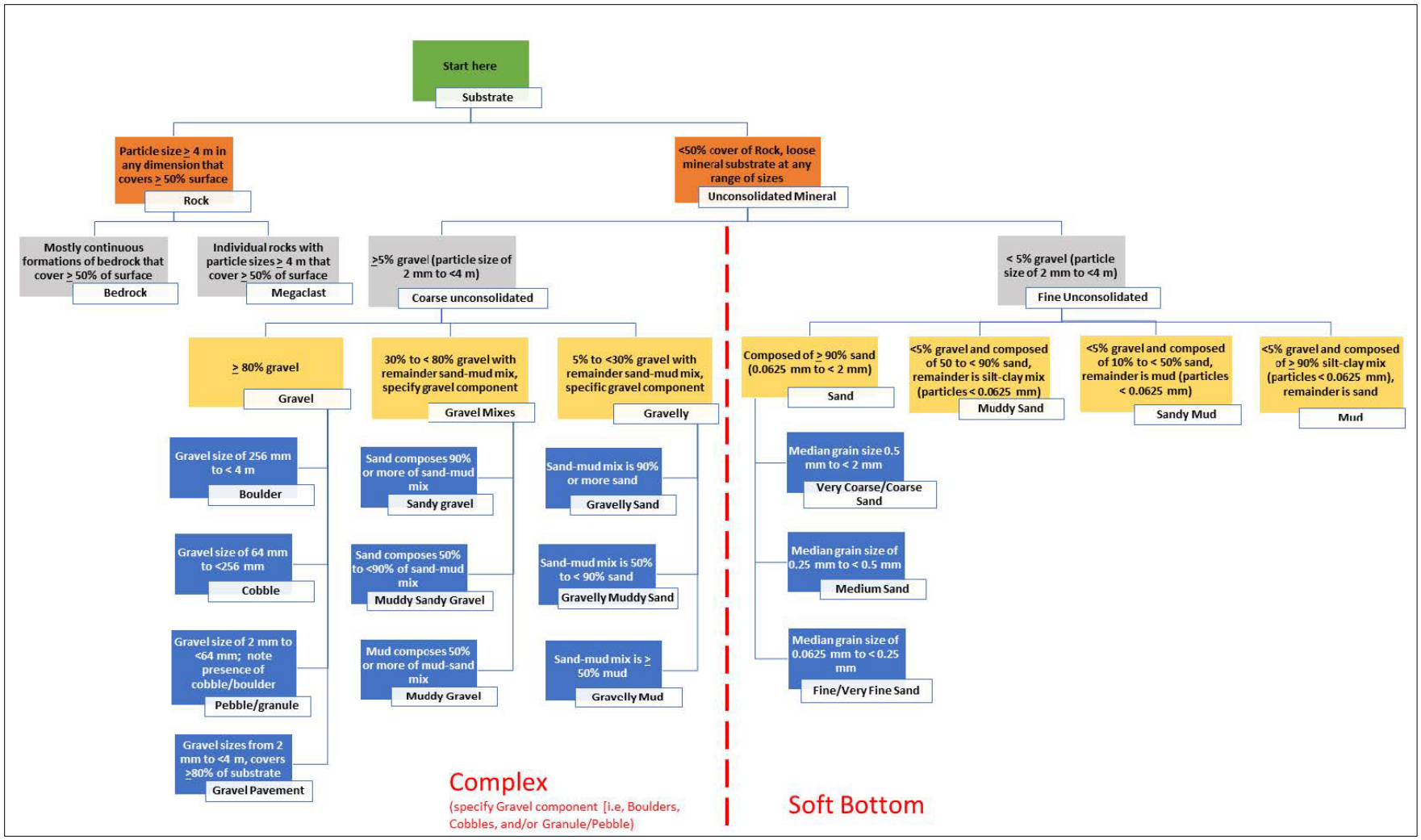


Figure 4-1 NMFS-Modified CMECS Decision Tree (Substrate)

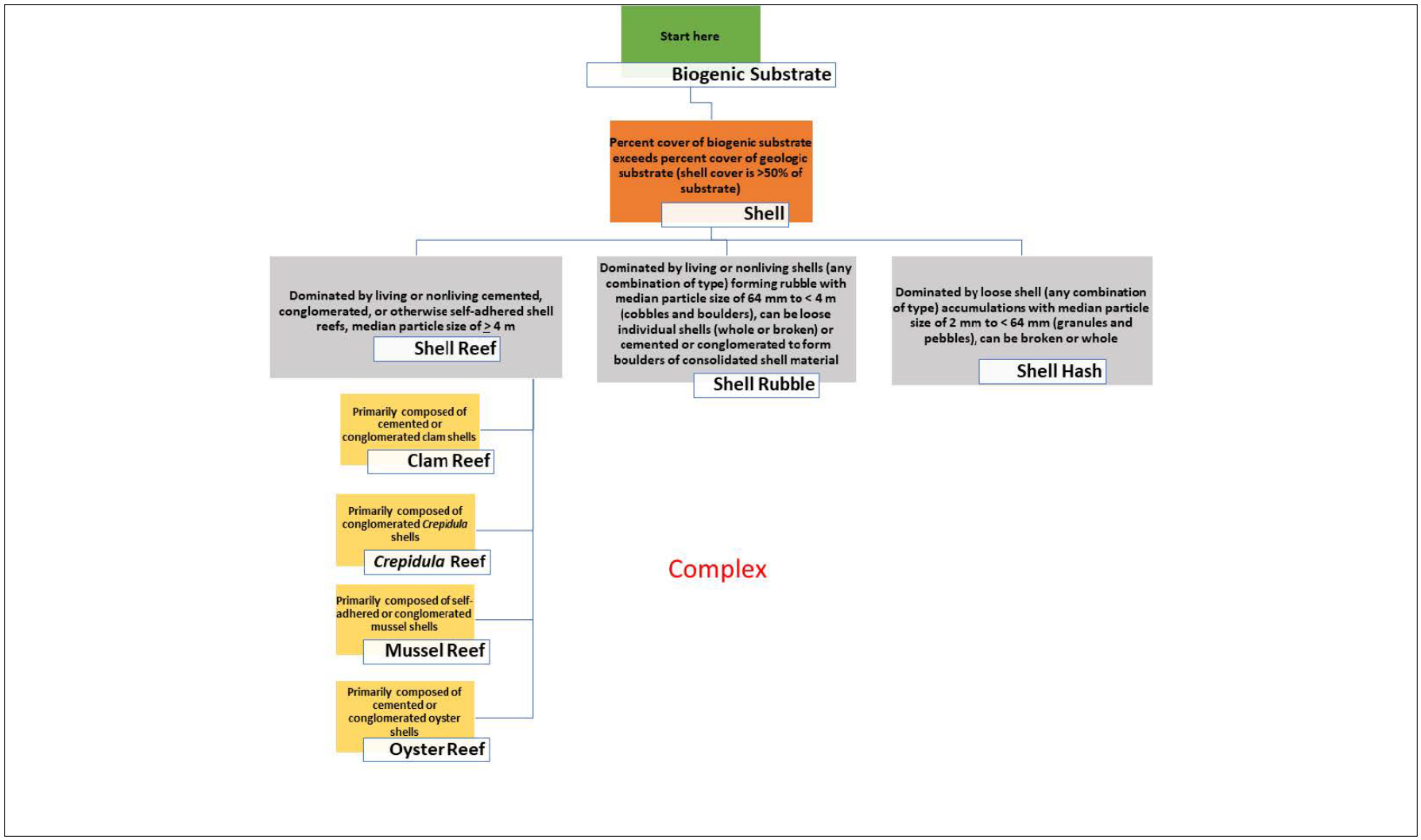
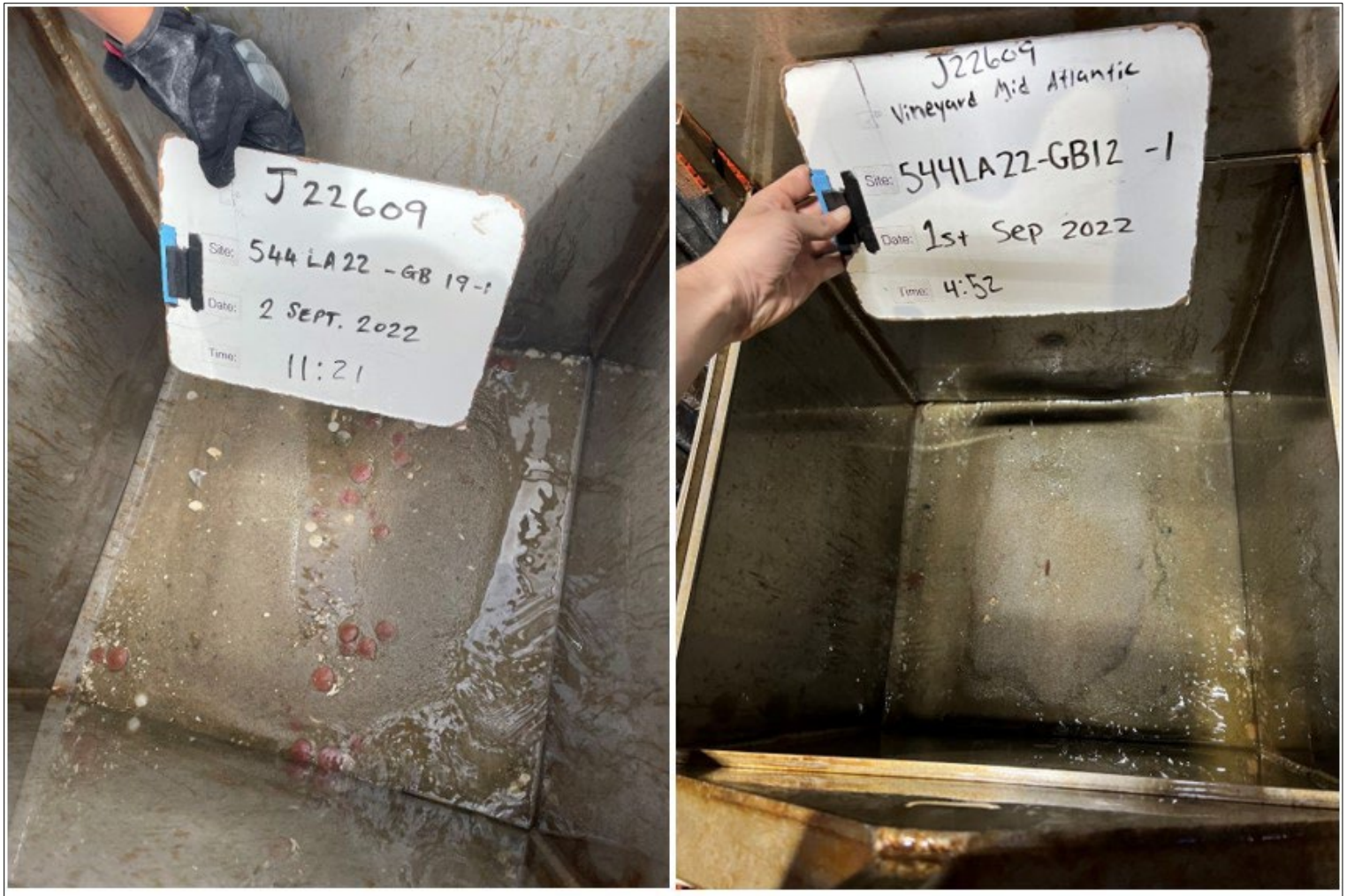


Figure 4-2 NMFS-Modified CMECS Decision Tree (Biogenic Substrate)



SAP-1: GB019; Medium Sand	SAP-2: GB012; Medium Sand

Figure 4-3 Deck images of grab samples, along with CMECS classifications

Figure 4-4 VT022 Representative image of SAP-1 VT022; Soft Bottom Habitat

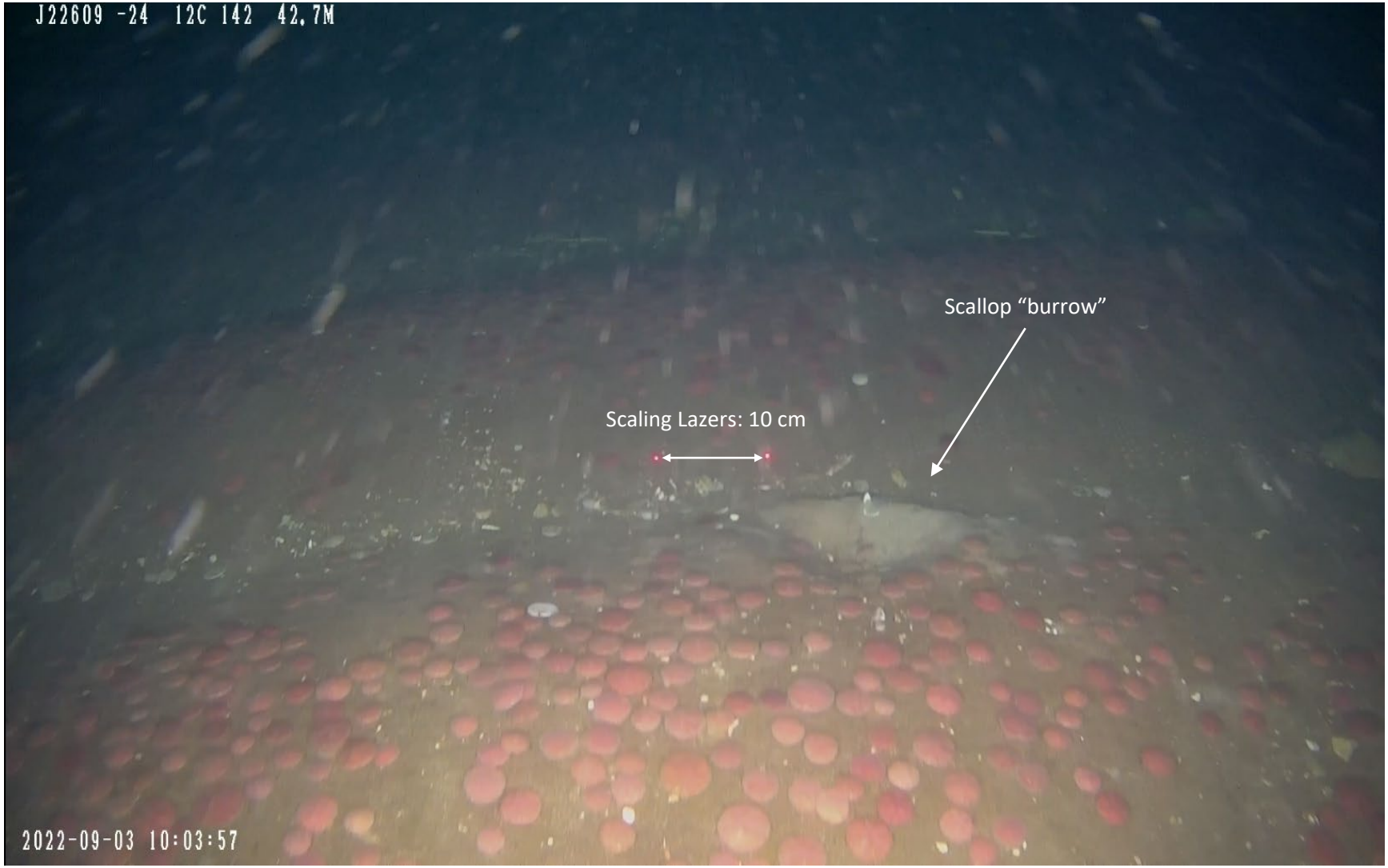


Figure 4-5 VT022 Representative image of SAP-1 VT022; Soft Bottom Habitat

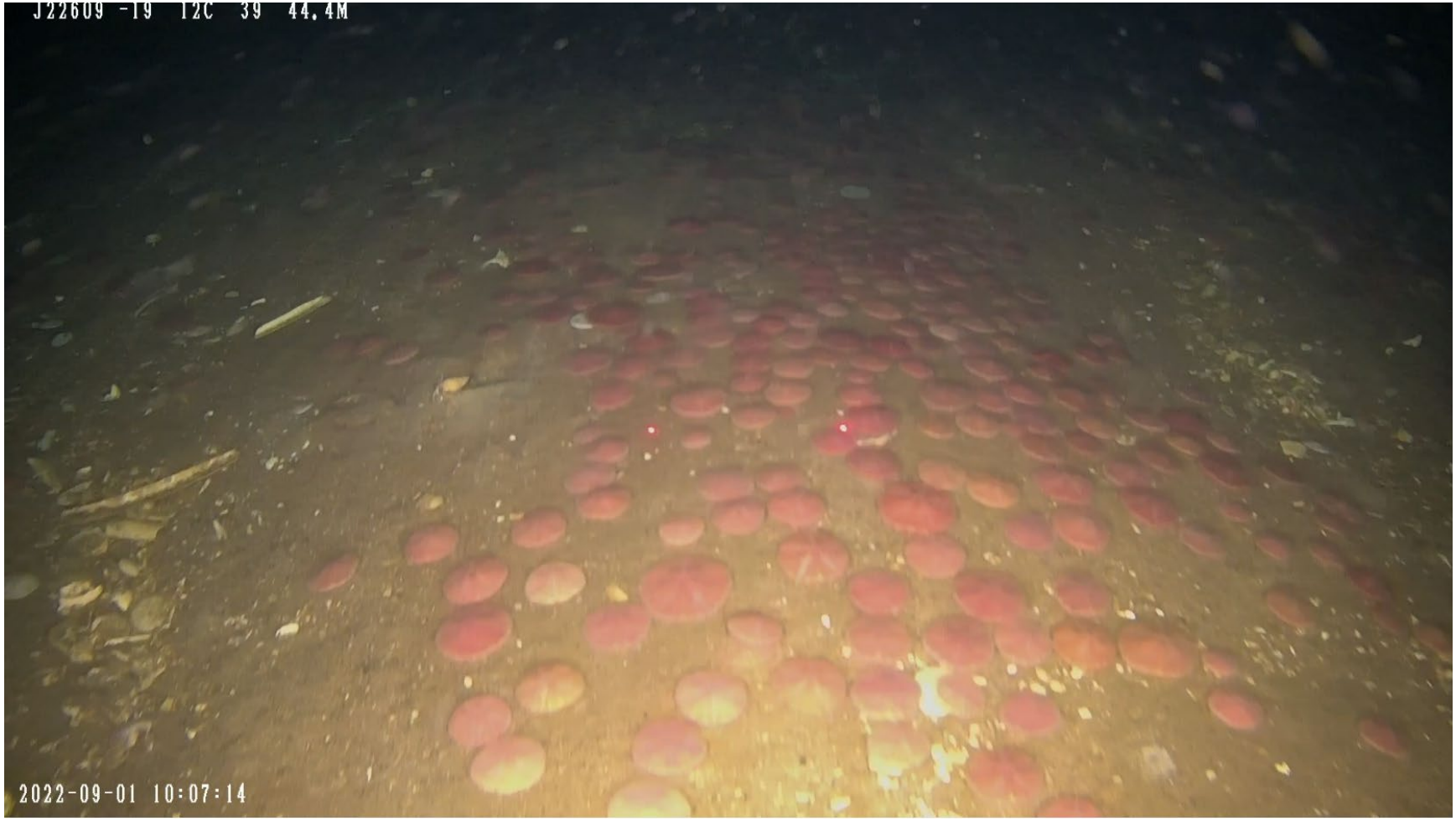


Figure 4-6 VT022 Representative image of SAP-2 VT017; Soft Bottom Habitat

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Vineyard Mid-Atlantic Site Assessment Plan

Appendix E

New York State Department of State General Concurrence Letter

Prepared by:
Geo SubSea LLC

In association with:

TDI-Brooks International, Inc & TRC

Prepared for:
Vineyard Mid-Atlantic LLC

January 2024

STATE OF NEW YORK
DEPARTMENT OF STATE
ONE COMMERCE PLAZA
99 WASHINGTON AVENUE
ALBANY, NY 12231-0001
HTTPS://DOS.NY.GOV

KATHY HOCHUL
GOVERNOR

ROBERT J. RODRIGUEZ
SECRETARY OF STATE

October 26, 2023

Jill Rowe
Epsilon Associates
3 Main & Mill Place, Ste 250
Maynard, MA 01754
Jrowe@epsilonassociates.com

Re: F-2023-0639
U.S. Army Corps of Engineers/New York District
Permit Application – ***Vineyard Mid-Atlantic, LLC.***
Installation and maintenance of one metocean buoy and one Trawl Resistant Bottom Mount in Lease Area OCS-A 0544 for 2-5 years.
Atlantic Ocean
General Concurrence

Dear Jill Rowe:

The Department of State (DOS) received your Federal Consistency Assessment Form and consistency certification and supporting information for this proposal on September 6, 2023.

The Department of State has determined that this proposal meets the Department's general consistency concurrence criteria. Therefore, further review of the proposed activity by the Department of State and the Department's concurrence with an individual consistency certification for the proposed activity are not required.

This determination is without prejudice to and does not obviate the need to obtain all other applicable licenses, permits, and other forms of authorizations or approvals which may be required pursuant to existing New York State statutes.

The Department recognizes that following the survey activities proposed in this action Vineyard Mid-Atlantic may propose to install wind turbine generators and electric transmission lines in the area being surveyed and develop its lease area. Please be advised of the applicability of New York's recently approved Renewable Energy Geographic Location Description (GLD)[1], which extends DOS's federal consistency review of specific activities (such as offshore wind development) in this geographic area.

As with all major infrastructure projects, early and continual coordination with all applicable regulatory and resource agencies will ensure that relevant concerns are understood and can be addressed early in the project planning. Therefore, the Department strongly advises Vineyard Mid-Atlantic contact us early in the process to discuss additional information and data needs anticipated as part of DOS's future federal consistency reviews of the Project.

[1] The NOAA-approved GLD can be found at https://dos.ny.gov/projects-outer-continental-shelf

For similar projects, the Department has found the following types of information are useful in supporting an applicant's consistency certification:

1. A robust alternatives analysis that includes all relevant project components and methods including consideration of relevant plans and assessments (e.g., NYSERDA Cable Corridor Constraints Assessment Report [NYSERDA, 2023]).
2. A detailed project description of the full range of activities, accessory facilities and support activities (e.g., installation methods, disturbance extents, burial depths, proximity to recreational uses, proximity to special area designations, interconnection facilities, types of vessels and specific ports engaged in construction activities, Operations & Maintenance facility upgrades and use, staging and marshaling activities, proximity to existing infrastructure, etc.)
3. A description of potential effects on existing land and ocean uses.
4. A description of any proposed avoidance, minimization, and mitigation measures.
5. A description of the construction, operation, and decommissioning phases of the project.
6. Shapefiles for project components, including metadata and a data dictionary. Please also consider providing this information to the Mid-Atlantic Ocean Data Portal (https://portal.midatlanticocean.org/) and the Northeast Ocean Data Portal (https://www.northeastoceandata.org/).

When communicating with us regarding this matter, please contact us at (518) 474-6000 and refer to our file #F-2023-0639.

Sincerely,

Rebecca Ferres
Supervisor, Consistency Review Unit
Office of Planning, Development and
Community Infrastructure

MK/RF
ecc: COE – Christopher Minck
DEC Central – Karen Gaidasz
Applicant – Rachel Pachter, Vineyard Offshore